INDIA RUBBER WORLD AND ELECTRICAL TRADES REVIEW

Published on the 15th of each Month by

THE INDIA RUBBER PUBLISHING CO.

No. 47 TIMES BUILDING, NEW YORK, U. S. A.

JNO. R. DUNLAP. H. C. PEARSON.

Vol. 9. MARCH 15, 1894. No. 6.

SUBSCRIPTIONS: $3.00 per year, $1.75 for six months, postpaid, for the United States and Canada. Foreign countries, same price. Special Rates for Clubs of five, ten or more subscribers.

ADVERTISING: Rates will be made known on application.

REMITTANCES: Should always be made by bank draft, Post Office Orders or Express Money orders on New York, payable to THE INDIA RUBBER PUBLISHING COMPANY. Remittances for foreign subscriptions should be sent by International Post order, payable as above.

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Trade supplied by the American News Co. and all its branches.

Entered at New York Post Office as mail matter of the second-class.

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A CORRECTION.

THE Bloomingdale Soft Rubber Works are located at Bloomingdale, N. J. Their product is a fine grade of mechanically-recovered rubber. The Raymond Rubber Co., located at Titusville, N. J., produce chemically-recovered rubber. These two concerns, in absolutely different lines of manufacture, have no connection whatever with each other. This statement is made because, in the last issue of THE INDIA RUBBER WORLD, the mistake occurred of saying that one of these companies "operated" the works of the other. Having inadvertently given place to this mistake, it is our wish to make this correction in as prominent a manner as possible.

RUBBER-MILL BURNED AT NAUGATUCK.

MILL No. 3 of the Goodyear's Metallic Rubber Shoe Co. [Wales-Goodyear], at Naugatuck, Conn., was burned to the ground on the night of February 20. This building, which was used as recovered-rubber plant, was of wood, two stories high, and contained seven grinders, magnetic machines, tanks, etc., used in the recovery of rubber. The wooden portion of the building was a complete loss; the engine, being in a small brick building near the plant, was not injured. The loss is said to have been about $30,000, covered by insurance as follows:

Norwich Union.....	$2,500	Liv. & Lon. & Globe.....	$5,000
New Hampshire.....	2,500	Northern Assurance.....	2,500
Royal, Liverpool.....	5,000	Phenix of New York.....	2,500
Hartford Fire	5,000	National of Connecticut...	5,000

Some weeks before the fire the company's new plant, one-eighth of a mile below the Wales-Goodyear mill, had been started on recovered rubber. As there was only a small amount of old shoes (constituting the crude material) in the building burned, the loss on the stock was slight.

DEATHS IN THE RUBBER TRADE.

CHARLES H. FLAGG, manager of Twenty-third street store of the Hodgman Rubber Co., died suddenly of heart disease at his place of business on February 28. Mr. Flagg was born in Waltham, Mass., in 1836. He came to New York in 1855, and had been connected with the rubber trade since that time. Previous to the war, he was in the vulcanite jewelry business with Shiffer & Co. At Mr. Shiffer's death Mr. Flagg continued the business at No. 713 Broadway. This was about 1863. His store was destroyed by a disastrous fire, and he removed to Broadway and Seventeenth street. There he was also burned out, and his next place of business was at No. 905 Broadway, where he remained until 1890. There he dealt in the general line of rubber goods, but in addition he had a large department of vulcanite jewelry, which was so popular in the earlier days of the rubber business.

In 1890 the store occupied by Mr. Flagg, with a number of those adjoining, was torn down to make a place for a large building, and at that time Mr. Flagg gave up his own business and made an engagement with the Hodgman Rubber Co. to act as manager of their Twenty-third street store, which was about then to be opened. In this capacity he continued to act until the time of his death. Mr. Elagg was in all respects a conscientious, upright gentleman, whose winning ways had made him very many friends. His death will be a considerable loss to the Hodgman Rubber Co., whose interests he had been looking after successfully ever since he had been with them. Mr. Flagg had been a widower for some years; he leaves a daughter.

JOHN H. TUTTLE, proprietor of the Tuttle Rubber Works, at Holyoke, Mass., died March 5, aged 68 years. He learned the rubber business and became superintendent of a rubber-works in Liverpool, England. Later he was employed in rubber-factories in Jersey City and in Easthampton and Northampton, Mass., starting business for himself at the latter place. He re-removed his business to Holyoke seventeen years ago, since which time it has been so conducted as to have been uniformly prosperous.

ANDREW JACKSON SHERMAN died at Bristol, R. I., on February 10, in his fiftieth year. He entered the cutting department of the National India Rubber Co. at an early age, and made the cutting and making of rubber boots and shoes a special study, with the result that he was made superintendent of that department. He was a prominent Mason, a member of the Grand Army of the Republic and of the Bristol Commercial Club, and is survived by a widow and three children.

A LARGE SALE OF "RAINBOW" PACKING.

THE Peerless Rubber Manufacturing Co. (New York) recently made a large sale of "Rainbow" packing, in regard to which Mr. C. H. Dale, general sales-agent of the company, has supplied THE INDIA RUBBER WORLD with the following details:

"We sold in Chicago, in January, in one invoice, to George B. Carpenter & Co., 420 rolls of 'Rainbow' packing, of the average weight of 200 pounds, or a little over 84,000 pounds altogether. This, at 35 cents per pound, amounted to $28,410. In the same invoice were 10,000 pounds of 'Eclipse,' 'Sectional,' and 'Rainbow' gaskets, at 50 cents per pound, and 4000 pounds of 'Peerless' piston- and valve-rod packing at 50 cents per pound, making a total of $35,000 worth of packing in one bill, an absolute sale to one party. There was, in addition to this, over $18,000 worth of steam-, fire-, brewers'-, water-, and other hose. This was no consignment, but an absolute sale, and I believe it to be the largest absolute sale on short time ever made—if not in the hose, certainly in steam-packing.

"By the way," added Mr. Dale, "I can give an item that will be of special interest to you. We are just shipping a large order of 'Rainbow' packing to Perdriau & Co., manufacturers and importers of India-rubber goods at Sydney, Australia. The first letter we had from them in July last referred to an advertisement they had seen of our concern in THE INDIA RUBBER WORLD. The large order I speak of is the result of correspondence started by that letter. We are also shipping 'Rainbow' packing to Johannesburg, South Africa, and have shipped 'Eclipse' gaskets to a new agency in the Sandwich islands.

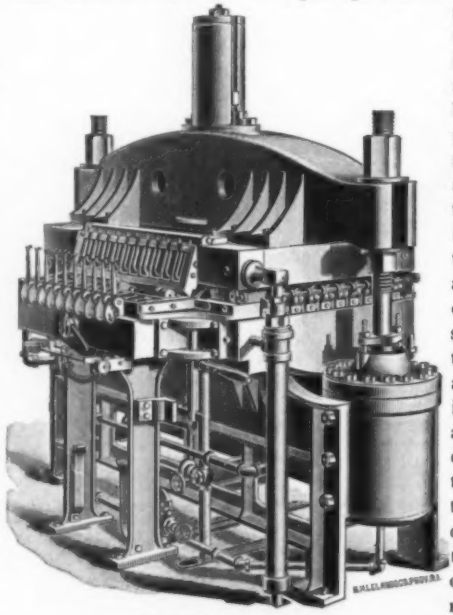
"Our sales for the last January were very large, larger than in the corresponding month of 1893. The sales were chiefly in the west. The western people are the large buyers. In the east they do a hand-to-mouth business. If only the Washington legislators could be induced to do something, one way or another, trade would certainly improve at once. It is clear to us that the stocks are exhausted, and that if any business is to be done at all buying has to begin."

WHERE GOOD SERVICE IS APPRECIATED.

AN illustration of some of the features of factory management in Germany is shown in this item from the *Gummi-Zeitung* (Dresden): Herr Edward Heeder, head cashier of the United Rubber-Goods Factories of Harburg-Vienna, recently celebrated his twenty-fifth year of service as officer of the firm. The voluntary fire-protection association of the firm's employés serenaded him, and four deputations, under the leadership of the director, Senator Carl Marct, marched to the house of the jubilar to convey to him the good wishes of the superintendents, directors, officers, workmen, and voluntary firemen, whose chief Herr Heeder is. At the same time the jubilee medal, accompanied by the diploma, was handed to the jubilar, and many valuable gifts were made on behalf of the managers, proprietors, and workmen. In the evening a dinner was served for seventy-five persons at the rathskeller, in honor of Herr Heeder, at the expense of the above-named societies. Herr Heeder is the one-hundred-and-twenty-seventh of the officers and employés who have received medals and diplomas for twenty five years' service since the foundation of the company.

THE MACHINE THAT MAKES MINIATURE BOOTS.

THE tiny rubber boots that just about fit upon one's finger are well known in the trade to-day and, indeed, are coveted by almost every one who sees them. Just how they are made is a mystery to many people. The illustration accompanying this shows the only machine in the world designed to mold boots of this kind. It is perhaps well to say, before describing this machine, that it is possible to make the boots by hand (indeed many thousands are made annually in that way) but it is a slow and tedious process and requires considerable skill. Nor are the boots that are turned out in that way all alike. In addition to this, the effect is apt to be clumsy as compared with the delicate outlines of the molded boot. The machine that produces these elegant results is really a hydraulic press fitted with a double set of molds. These molds are so arranged that when one set is in the press the other occupies the standard in front of the press, automatically opens, and stands the tiny metal boot-trees on end with the finished articles resting upon them. A glance at the engraving will show the mold open and a row of boot-trees at the outer edge of the mold. It is the simplest thing in the world to make these boots with the help of this machine. A few strips of rubber are placed in the matrices, a lever is turned, the mold closes and is carried under the press, the top platen of the press lowers itself gently, and in a very few minutes a dozen pairs are cured. It is a curious fact that this type of hydraulic press was brought out in a rubber-shoe factory, whereas the ordinary hydraulic press has been an outgrowth of the mechanical-goods plant. The press is covered by patents and is the property of the Marvel Rubber Co.



MINIATURE-BOOT PRESS.

THE CAUTCHOUC SUPPLY FROM BRITISH INDIA.

*By Clements R. Markham, C. B., F. R. G. S., F. S. A.,**

President of the Royal Geographical Society.

IN the year 1870 the present writer came to the conclusion that it would be desirable to establish plantations of *Ficus elastica* in British India, and also to introduce the best kinds of India-rubber-yielding plants from South America, for the same danger appeared to threaten the India rubber trees as had aroused anxiety respecting the quinine-yielding *Cinchona*. Owing to the enormous demand for caoutchouc the most reckless felling of trees was going on in the tropical forests which yield this valuable product. The time seemed to have come when plantations should be formed of caoutchouc-yielding trees, in order to prevent their eventual destruction, and to provide for a permanent supply.

In commencing caoutchouc-cultivation in India it was deemed important, in the first place, to take stock of all existing knowledge on the subject, and, in the second place, to ascertain whether any of the other kinds were intrinsically superior to the *Ficus elastica* of Assam; be cause if this proved to be the case, their cultivation in India would also be desirable. With these objects in view, I en trusted the duty of making the necessary researches and investigations to Mr. James Collins, then curator of the museum of the Pharmaceutical Society in London. He drew up a very able report on the subject, which confirmed me in the conclusion that the establishment of plantations of *Ficus elastica* should at once be undertaken in Assam; and that, as the caoutchouc of the *Heveas*, *Manihots*, and *Castilloas* of South America was superior to that of the *Ficus*, those trees ought to be introduced into India.

The first step was to commence the cultivation of the native Indian caoutchouc trees, which are found in the forests along the northern and eastern boundaries of Assam, as well as in the low valleys of the Naga and Jaeritia hills to the south. Hitherto the caoutchouc had been collected in Assam by men of the wild tribes, who cut every part of the tree they could get at, and allowed the milk to flow into holes made in the ground. The collectors were encouraged to obtain the largest possible quantity during the shortest possible time, without any regard to future supplies. This had led to the wholesale destruction of these valuable trees, by felling them so as to render the operation of tapping more easy. I represented that it was necessary to place the collection of caoutchouc in Assam under the control of public officers who should have an interest in the protection and improvement of the forests, and to commence the formation of *Ficus elastica* plantations on a well-considered plan. Dr. Brandis, the inspector-general of forests in India, fully concurred in my views. In 1874 Mr. Gustav Mann formed three plantations in Assam, one on the right bank of the river Kulsi, which, by 1879, consisted of 2895 plants on 95 acres; a second at Chardnar, at the foot of the Himalayas, of 685 trees; and a third at Bamuni, near Tezpur. The trees were healthy and vigorous in 1879. They may be tapped at the age of twenty-five years, and after fifty years they may be expected to yield forty pounds of caoutchouc every third year. At present there are 12,511 trees, in lines twenty-five feet apart, on the Chardnar plantation, which includes 892 acres; with 184,000 young plants in twenty-three acres of nursery. In May, 1884, an order was issued to increase the plantations by 200 acres annually.

It will be seen that the cultivation of the indigenous kind of caoutchouc-yielding trees in British India has been actively progressing for the last twenty years. The second, —and, as I believed, not the least important—part of the undertaking was the introduction, from South America, of plants yielding a better kind of caoutchouc. The most valuable trees are undoubtedly the *Heveas* of the Amazon valley, yielding what is known in commerce as Pará rubber. Next in value and yield comes the rubber obtained from the *Castilloa* trees of Central America, and the third

* CLEMENTS ROBERT MARKHAM has been long interested in Peru—in fact, since the time when he was serving as a midshipman on board H. M. S. *Collingwood* on the Pacific station, and read Prescott's "Conquest," while at anchor off Callao. After taking part in the Arctic expedition in search of Sir John Franklin in 1850–51 he left the navy, and afterwards spent two years in traveling over Peru and exploring the forests to the eastward of Cuzco. He there became acquainted with the *Cinchona* trees, yielding quinine, and with the *Siphonias*, yielding rubber. On his return to England he received an appointment in the India office, and when the government became anxious to introduce *Cinchona* cultivation into British India, his services were accepted, in 1859, to arrange and superintend all the necessary measures. Ths work included another visit to Peru and the eastern forests, and two visits to India—from 1859 to 1867. He then became impressed with the desirability of bringing under cultivation the best kinds of rubber, which embraced those of Pará and Ceará, and the *Castilloas*. He obtained sanction from the government to take steps for this purpose, and in 1870 he adopted the measures which have been described in this paper. Mr. Markham was secretary to the Royal Geographical Society from 1863 to 1888 and was elected president of that society in 1893. He retired from the India office in 1877.—THE EDITOR.

kind, which I determined to introduce, was the *Manihot Glaziovii*, from Ceará, in Brazil.

Several reasons led me to the decision that a collection of *Castilloa* seeds should first be obtained. As these trees thrive in a greater variety of soil and climate than the *Heveas*, it was more likely that suitable sites for their cultivation would be found in India and Burmah. The service of collecting *Castilloa* plants and seeds was a very difficult one, for the trees grow in wild and unhealthy forests with no means of transit, and no facilities of any kind. In Mr. Robert Cross, an experienced gardener who had previously been employed by me in the collection of cinchona plants and seeds in Ecuador and Colombia, I found a man with all the requisite qualifications for undertaking it. With the sanction and at the expense of the secretary of state for India, Mr. Cross left England in May, 1875, and reached Panama in the end of May. He found that great destruction was going on among the *ulé* (*Castilloa*) trees on the Darien isthmus. He selected the forest on the banks of one of the large tributaries of the river Chagres as the base of his operations. He found the trees growing to a height of 160 to 180 feet, with a diameter of five feet, and a yield of 100 pounds of rubber. The wood is spongy and soft, and decays rapidly when bruised or injured. The forest was excessively damp, with a temperature from 75° to 80° F. Mr. Cross collected 600 young plants of the best species, and left the isthmus with them in September, 1875. Many died, but 134 plants were established at Kew gardens, and in the course of 1876 a supply of *Castilloas* was transmitted to India.

For obtaining plants yielding the rubbers of Pará and Ceará I was again so fortunate as to secure the services of Mr. Cross. He left Liverpool in June, 1876, and reached Pará on July 15. He then proceeded to explore the *Hevea* region, which is cut by deep gulley-like natural ditches called *gapós*, which penetrate for miles into the vast forest region, and are daily filled by the tide. The intervening land, between the *gapós*, owes its origin first to tidal deposits, and has afterwards been raised by the decayed remains of a long series of rank growths of vegetation. On August 2 Mr. Cross followed the tracks of the rubber-collectors through the dense forest, ankle deep in mud, till he came to a wide *gapó*, connected with many lesser water-courses. *Hevea* trees grow along the margin of the streams. He proceeded with the work of collecting young plants until he had established 1000 in four wooden cases. In October he shipped them for Liverpool, but only thirty plants survived. In 1876, Mr. Wickham, a traveler well acquainted with the Amazon valley, sent 70,000 seeds of *Hevea* to Kew, of which 4 per cent. germinated, and supplies were sent to Ceylon and Burmah.

Mr. Cross then proceeded to Ceará, where he found himself in a very different region from that of the Amazon. South of the Amazonian forest there is a region known as the *sertas*, or wilderness, extending in a broad belt from the Karnahyba river to the São Francisco. The state of Ceará lies within this belt—high, rolling plains broken by abrupt elevations. The plains are occupied by thin forest growth, or by pastures and sandy tracts with groves along the river-courses. From June to December the climate is very dry, and there are rains in December to March. Mr. Cross stopped at a village called Maracanahú, about thirty miles from Ceará, where he obtained a guide to take him to the India-rubber trees. The forest was tolerably high, but the sparse foliage did not afford much shade from the fierce rays of the sun. Neither grass nor weeds grew under the trees, and there was an entire absence of ferns and mosses. At first sight the Ceará rubber-tree resembles a birch, and the outer bark comes off in the same way, in thin, silvery peelings. The largest are about fifty feet high. Having found some young plants, Mr. Cross had difficulty in uprooting them. The roots have tubers the size of kidney potatoes, which adhere with great tenacity to the soil. After diligent search and very severe labor eighteen plants were collected, and taken safely on board the steamer. Afterwards he obtained forty-two more plants and 700 seeds. He arrived at Liverpool in November, 1876, and his valuable collection was deposited at Kew gardens next morning.

Owing to the apathy and indifference of the government of India I considered it safer, in the first instance, to send the South American rubber-plants to the Pérádeniya gardens, in Ceylon, whence their cultivation could be extended to India, when its importance was better appreciated by the authorities. The Ceará plants arrived in Ceylon in October, 1877, and have grown admirably in the Pérádeniya and Henaragode gardens, producing ripe seeds which were sent for trial to Calcutta, Madras, and Burmah. The *Hevea* also grows extremely well, and the cultivation of the *Castilloa* is very successful. I attached special importance to the Ceará plants, because they will be likely to thrive on the hot and dry plains of India.

My hope was that the *Castilloa* trees would find a new and congenial home in the western Ghats, that the *Hevea* would thrive in Burmah, and that the Ceará, with quite a different habitat and requirements, would be extensively grown on the drier plains of India. The measure, if it had been intelligently and continuously followed up, would have ensured in the future, and as the demand increased, a regular and large supply of the best kinds of caoutchouc from British India.

The result has not altogether come up to the hopes that were entertained. The plantations of *Ficus elastica* in Assam are flourishing, and may be considered to be a complete success. But the cultivation of *Hevea* in Assam failed completely. In 1882 it was also abandoned in Ceylon. Colonel Seaton was more persevering, and, therefore, more successful in Burmah. In 1886 he formed a plantation of fifty *Hevea* trees in the district of Mergin, and in 1888 some of them were forty feet high. In the next year 14,841 plants were growing, and Colonel Seaton was able to try a tapping experiment. So that the *Hevea* plantation in Mergin may also be considered as a success. The *Hevea* has found a congenial home in Tenasserim, and is quite acclimatized. The arrival in the markets of the world of Mergin rubber derived from the *Hevea* trees will be looked forward to with great interest.

Many localities are well adapted for the growth of

Castilloa trees in Wynead and other forest districts. Mr. Lawson, on the Nilgéri hills, reports that they have seeded in the Burligár gardens, that the seeds have germinated freely, and that they are easily propagated from cuttings.

The Ceará rubber-tree (*Manihot Glaziovii*) grows readily in Ceylon from seeds or cuttings, and in 1884 there were 977 acres of it under cultivation in that island. But since that time the planters have abandoned it. It grows well, however, at Calcutta, and has been largely distributed, as well as in the hills of southern India.

Thus the three most valuable kinds of South American rubber-trees have been acclimatized in India; and a thriving plantation of the *Hevea* trees is now established in British Burmah. In spite of official apathy and indifference, there is every prospect of British India eventually becoming an important source of supply for all the best kinds of rubber.

THE PROPER PLACE FOR RUBBER CULTIVATION.

By Courtenay De Kalb.

IN a recent communication from Ceylon* Professor Henry Trimen, director of the Royal Botanic Gardens at Pérádeniya, states that India-rubber in that island has proved an experimental success, and he anticipates a great future for the rubber industry if the government will take it up on a large scale. He does not think it is suitable for private growers, owing to the great length of time required for the trees to reach maturity, and also because of the best species—*Hevea Brasiliensis*, which produces the "Pará" grade—must be cultivated in low, wet situations which are unhealthy and unsuitable for Englishmen. Professor Trimen advocates the culture of the Brazilian tree, as being the most profitable. There is now a plantation of 300 trees established at the botanic garden at Pérádeniya, some of which are fifteen years old. A single tree has yielded 7 pounds 2¾ ounces of dry rubber in the last three tappings. It is noticeable that he states that the tappings were made in alternate years, the reason for which does not appear, although of course such treatment will inure to the health and longevity of the tree.

Many other sorts of rubber producing plants have been tried in Ceylon, and all yield as good rubber there as in their native countries, but the Ceará rubber tree (*Manihot Glaziovii*) does not thrive so well. This is not surprising, considering that its native habitat is a very dry climate. In spite of this drawback, groves have been set out in Ceylon, and a few planters have made it pay. The "Panama rubber" (*Castilloa elastica*), the species common to Central America and northern and western South America, fails to yield sufficient quantities in Ceylon to be profitable, but the quality of the rubber is excellent.

From this it would appear that the common species of rubber-trees are sensitive to changes in environment to an extent even which would scarcely have been supposed *á priori*, and hence we may expect success only within the limits of their present natural distribution, or in climates in all respects similar. This question of adaptation to new regions being thus answered mainly in the negative, it is important to arouse an intelligent appreciation of the need of planting rubber-orchards in Latin America. It is interesting to note that Honduras has recently taken this matter in hand, and has attempted to stimulate rubber-growing by offering a cash bounty of ten cents per tree to all farmers who shall set out 2000 trees. This will doubtless produce good results to some extent, but it offers no incentive to careful cultivation, and protection of the health of the trees,—to that good husbandry, in short, which is lacking to such a serious degree in Spanish America, and particularly in those regions where the inhabitants have come to depend largely upon the uncultivated produce of the earth. If the rubber-exporting countries of Latin America would offer a bounty upon all rubber extracted from cultivated orchards, the increase of dutiable importations as a result of any exportations of cultivated rubber not only would repay the bounty, but would more than indemnify the government for the loss of revenue from the export duties on that amount of rubber. It would not decrease the amounts obtained from the wild trees, but would add just so much wealth to the nation, which does not exist to-day, and would insure a continuous production of the precious gum, thus giving rise to a steadily-growing commerce that would provide a revenue which could be depended upon from year to year.

In spite of frequent discoveries of new reserves, which temporarily sustain the usual volume shipped to market, it is apparent to any one who has gone beyond the port cities into the wildernesses of South America and Central America that the rubber-trees are being destroyed at an alarming rate, and that the world will feel the shortage before many years have passed,—in fact before rubber-orchards planted now will come into service. To see river after river, once occupied by hundreds of rubber-cutters, once having frequent trading-posts along their banks, but now abandoned, tells the tale of exhaustion of the rubber-forests in no unmistakable manner. Each year's delay in establishing orchards is endangering the future of this industry, and inviting hardship for the governments and people of these rubber-producing countries, and the state which offers the earliest and most liberal inducements to rubber cultivation will witness the most rapid increase of colonization in those regions which are to day little more than a howling wilderness, and will enjoy an immensely larger measure of prosperity in the future.

*The experiments in rubber-culture in Ceylon must be regarded as the most important yet made outside the natural habitat of the trees here discussed, and upon the results there attained must rest, to a large degree, the question of the further development of this industry except, as Mr. DeKalb suggests, in the countries where rubber-producing plants flourish naturally. The Ceylon experiments cannot be said, however, to have been completed.—THE EDITOR.

PRIZE RUBBER-PLANTATIONS IN COSTA RICA.

Success of a North American Planter.

AT the office of Messrs. Flint & Co., large India-rubber importers in New York, a representative of THE INDIA RUBBER WORLD sought the views of the firm in regard to the practicability of rubber-cultivation.

"The dependence for the world's requirements must continue to be on the tropical forests," said a member of the firm, "and from all appearances the source of supply seems to be inexhaustible. There is no doubt that there is a vast field in both Brazil and Africa which has not yet been drawn upon to any extent. In certain sections, however, the rubber industry has come to an end through the exhaustion of the forests. This is true of certain portions of Central America from which rubber was formerly received, but which to day send no supply of that article to our market,—such as Guatemala and Costa Rica.

"This leads to the question of rubber-plantations. While we believe that the attempts at cultivation of rubber have not yielded the expected results, the conclusion is not a sound one as against their profitableness, but up to date rather bears upon the desultory and unsystematic way in which the attempts have been made. In some of those Central American states to which we have just referred there is now some systematic work being done in the direction of rubber-planting. In Costa Rica the government some years ago passed laws prohibiting the tapping of the trees, and at the same time offered premiums for rubber plantations. There were two prizes awarded —of $8000 and $5000 respectively—for the two best rubber-farms. The largest landowner in that state—Mr. Minor C. Keith, whose home is in Brooklyn, N. Y.—has planted a large number of rubber-trees on his estates, not far from Port Limon, which now include the two prize rubber-farms just mentioned. Correspondents of ours who recently visited Costa Rica and made a very careful examination of the country and of its different products report the rubber-plantations of Mr. Keith in a flourishing condition. They will soon be ready for tapping, being between eight and nine years old, which is about the time that a tree requires before it can be tapped to advantage. We consider this experiment a very important one, as it is the only one that we know of which has been conducted with intelligence, system, and energy. There is every indication that it will prove very profitable.

"Rubber-cultivation in Costa Rica is very simple and inexpensive. The planting is done from the seeds, and generally in connection with that of the banana, the shade of the latter tree, which grows very rapidly, protecting the young rubber tree until it becomes independent of that assistance. The only further attention which the rubber-tree requires is to have the ground near its roots kept clear until it is strong enough to take care of itself. The rubber tree, which is indigenous in Costa Rica, is very prolific, and under each female tree are usually found hundreds of small trees growing all the time from the seeds which have fallen upon the ground. About the time the rubber trees attain the minimum age for tapping the banana-plants become exhausted (their life being only about eight years), and the rubber-tree remains in possession of the ground.

"The labor employed in Costa Rica is mostly that of the natives, but there seems to be no difficulty in obtaining a further supply whenever it is wanted, Jamaican negroes being easily obtainable, especially since the work on the Panama canal stopped. There is also a concession made by the Costa Rican government for the introduction of Japanese, but nothing has been done as yet in that direction.

"There are now more than 25,000 rubber-trees on the plantations of Mr. Keith, there being about 150 trees to the acre. We believe that, if the result obtained from these farms is as good as there is every reason to believe it will be, it will lead to further plantations in those countries where the rubber yield has been diminishing, owing to the disappearance of the natural forest.

"We shall be glad to report further to THE INDIA RUBBER WORLD as we obtain further information in reference to this interesting and distinctly American enterprise. The management is entirely in the hands of North Americans, and the result will show what Americans can do in that field."

RUBBER AND COFFEE IN CEYLON.

THE experiments in the cultivation of coffee and rubber in conjunction in Mexico, which have been discussed at length in THE INDIA RUBBER WORLD by Mr. F. O. Harriman and the Mexican minister at Washington, have been regarded with interest in the far east. One of the most interesting exchanges received at this office is *The Tropical Agriculturist*, published at Colombo, Ceylon, devoted to information regarding products which in America are scarcely regarded as pertaining to agriculture, prominent among them being tea, coffee, cocoa, sugar, cinchona, rubber, and palms. The publishers of the *Agriculturist* long have been personally interested in the development of the planting enterprise in Ceylon, and from the beginning they have regarded rubber as one of the products which might be cultivated with success in that colony. They have appreciated, however, the fact that under any circumstances a number of years would be necessary for making any satisfactory test, for the reason that rubber-trees cannot be tapped before they have reached some degree of maturity.

Mr. Harriman's first article describing his Mexican experiment was reprinted in *The Tropical Agriculturist*, since which time several contributions on this subject from interested

readers have appeared in that paper. The first publication was accompanied by the editorial comment that in Dumbara the Ceará rubber-tree (*Manihot Glaziovii*) had not proved successful as a shade-tree for coffee, but that this was due in part to the small yield of rubber from these trees, which afforded no suitable return for the cost of planting. Such a yield of rubber, however, as Mr. Harriman claimed, would place the subject in a new aspect. It might justify stronger hopes of success from the planting of rubber and coffee together than anything yet experienced in Ceylon planting.

Throughout Ceylon shade for coffee and tea is regarded as essential in many of the low-lying districts, and a correspondent of the *Agriculturist* at Kandy, who has succeeded in growing rubber from the *Castilloa elastica* tree, after reading of the Mexican experiment, expresses the belief that this plant might well receive the attention of coffee-growers. The same correspondent has placed at the disposal of the editor specimens of *Castilloa* rubber which, when sent to the London market, attracted favorable attention and were pronounced little inferior to Pará rubber.

The publishers of *The Tropical Agriculturist* compile from time to time a directory of Ceylon plantations, the last of which appeared only a few months ago. There were then under cultivation on the island 265 acres of India-rubber trees alone—of species imported from South America—while taking into account the rubber grown in connection with other products it is estimated that the total number of trees was equivalent to one plantation of rubber alone of 521 acres.

In the *Ceylon Observer* (Colombo) of February 25, 1887, appeared reports of several plantations of Ceará rubber, the details of which are herewith tabulated:

No. Acres	Age of Trees.
25	4 years.
9	5 years.
15	4 years.
10	4 years.
35	3 years.
11	4 years.
3	3 years.
30	5 years.
5	4 years.

There were, in addition, many isolated trees or trees in small groups, under cultivation but not susceptible of estimate as to numbers or area covered. Presumably some of these plantations, at least, are still cared for, in which case the trees would be eleven or twelve years old.

A BRAZILIAN VIEW OF RUBBER-CULTURE.

TO THE EDITOR OF THE INDIA RUBBER WORLD: The arguments published in favor of rubber-tree culture are very plausible, but many seem unaware of the fact that even the oldest rubber-forests are constantly renewing themselves. Worn-out trees are substituted naturally by new ones. A proof of this is the constantly-increasing supply of rubber from the state of Pará alone, from the same districts. New trees in a few years begin to yield rubber, and, when carefully taken care of, as in the state of Pará, grow wonderfully, yielding year by year more rubber. There is about as much probability of rubber giving out in the Amazon valley as there is of coals doing so in England. Consequently, there is no need of cultivating what nature yields so spontaneously, as was similarly remarked by a gentleman writing on the subject in the last number of THE INDIA RUBBER WORLD. Better let well enough alone.

M. F. SESSELBERG.

Pará, Brazil, February 12, 1894.

RUBBER-TREE CULTURE IN MEXICO.

TO THE EDITOR OF THE INDIA RUBBER WORLD: I have looked somewhat into the feasibility of rubber-culture, as brought to my notice of late while interested in the gathering of wild rubber in southern Mexico, and from what I learn from my partner, who is on the ground, I believe the matter will receive a practical test in that section, and in a most thorough manner. A number of rubber-plantations are being set out in our region by coffee-planters, and the general opinion of experienced men in that section is that it is a crop that requires less care and attention than coffee, and is far more profitable. These are only opinions, however, but they are deduced from real experience on a small scale, the rubber-tree having been grown there with coffee for some time past, but no mature orchards of rubber exclusively are yet to be found there.

W. R. RATHVON.

Chicago, Ill., February 18, 1894.

* * *

TO THE EDITOR OF THE INDIA RUBBER WORLD: Will you be so kind as so give me some information in regard to planting rubber-trees, the length of time it will take before the tree can be tapped, and the yield of fluid in Mexico; also the expense? References to any literature on the subject will be gladly received.

EDGAR ZEH, M.D.

Waterford, N. Y., February 12, 1894.

[MR. F. O. HARRIMAN has in Mexico a plantation of rubber-trees which, he estimates, will yield at seven years a larger output of rubber than has ever been gained from the wild trees of that section. He has shown to the editor of THE INDIA RUBBER WORLD some specimens of goods manufactured from rubber obtained from cultivated trees four years old. His advice, however, is not to tap them before six years, after which he estimates the yearly yield at three pounds. The Mexican minister at Washington, a number of years ago, planted some rubber-trees in Soconusco, with the idea that the trees would yield, after the sixth or seventh year, about three pounds each. His estimate of the cost of a plantation of 100,000 trees up to the productive age—six years—was about $8000. Mr. Harriman has cultivated rubber and coffee together, so that his report does not give the cost of rubber-culture alone. This industry is in the experimental stage, the work which has been done in it being for the most part too recent to admit of conclusive results. There is little to be said in regard to it newer than what is contained in a little book entitled "India-rubber and Gutta-percha: Being a Compilation of all the Available Information Respecting the Trees Yielding these Articles of Commerce, and their Cultivation. Second edition. Colombo, Ceylon: A. M. & J. Ferguson, 1887." It should be read by any one interested before investing in rubber-planting. —THE EDITOR.]

TAPAJÓS-RIVER RUBBER AT A DISCOUNT.

A LETTER received by THE INDIA RUBBER WORLD from Pará contains an item that will be of interest to the rubber trade as showing a tendency there to discourage the marketing of the less desirable grades of rubber. The writer says:

"The principal rubber-merchants here have combined to refuse to buy the rubber from the river Tapajós, under present conditions, as it is of such bad quality and difficult to sell in foreign markets."

The Tapajós flows from the south, through the western part of the state of Pará, reaching the Amazon at Santarem, and formerly ranked among the important rubber-producing streams.

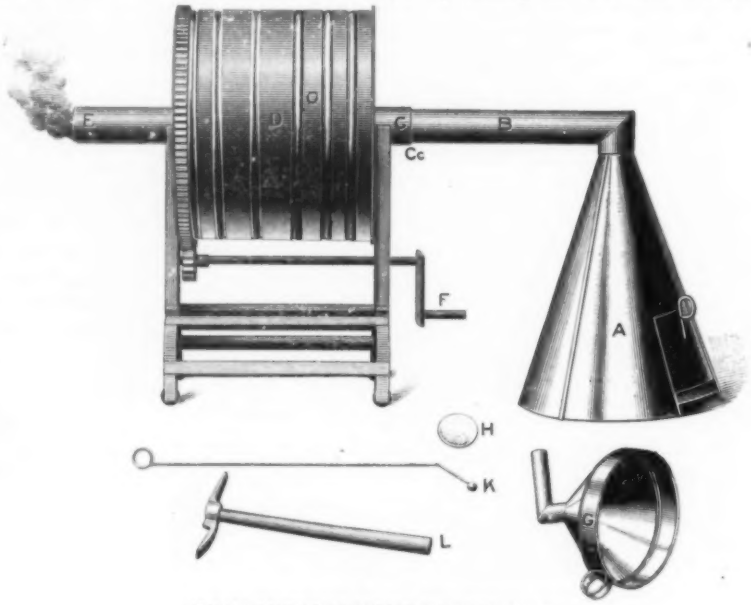
A MACHINE FOR CURING INDIA-RUBBER SAP.

By Mme. M. F. Sesselberg (Pará).

MANY have been the attempts, among the rubber-gatherers of the Amazon valley, to find a substitute, in the coagulation of the sap, for the tiresome curing by smoke. The use of chemicals has been proposed, time and time again, with the result that the rubber produced seemed to lack elasticity or some other essential quality. To hasten the curing of the sap, and to prevent its coagulation before curing, the sap has been boiled, much to the detriment of the rubber. Others have tried beating the milk into a foam, which would create air-bubbles, filling with water, thus increasing the weight for a time and causing harm to the product in the end. All these and many other processes have caused endless reclamations from rubber-manufacturers, and not a small loss to the producers.

In smoking rubber by the old system the process has often been imperfect simply because the distribution of the milk on the form has been irregular. Some part of it has not been properly or sufficiently smoked, thus admitting impurities. Still oftener the cake, after one day's work, is laid by, and the next day taken again, after having some impurities fastened to it, and the work continued.

All these defects may easily be avoided, according to the inventor, by the use of the new machine invented and patented by a Brazilian citizen, Sr. Manuel Vianna Coutinho. By its use the rubber is cured in thin, compact, endless belts—or sheets, if cut open—of some 60 inches long, 16 to 18 inches wide, and a thickness, say, of 1 to 2 inches. The accompanying engraving has been made from a photograph of the machine kindly sent by Mr. Coutinho, with his explanation of the same, and method of working:



SENHOR COUTINHO'S RUBBER-CURING MACHINE.

It is composed of a wooden cylinder *D*, about 20 inches in diameter and 18 or 20 inches in length, set on a stand with crank, *F*, on the bottom, by which the cylinder is revolved by means of cog-wheels. The short tube *C*, for the admission of the smoke, and the longer one *E*, for the ejection of the same, are fixed or fastened to the heads of the cylinder, serving as an axle to the entire drum. The right-hand head has a circular opening in its center which is about 12 inches in diameter, and has an air-tight cover. In the center of this cover is the tube *C*, which is held in place by four buttons. The conical smoke-generator *A*, is supplied with a tube *B*, which is inserted into the tube *C* sufficiently far to permit its upturned inner end (not shown in the engraving) to throw the smoke into the top of the cylinder. The funnel *G*, with its strainer *H*, and the testing probe *K*, complete the outfit.

The manner of using the machine is thus described: Remove the drum from the stand, take off the cover in the right-hand head, and cover the inside of the cylinder with a thin layer of clay, as is usually done with the old-fashioned forms. Secure the cover in its place with the four buttons, and place the drum again on the stand. Place the funnel *G* (with the strainer *H* in the bottom of it) into the tube *C* and pour therein the milk ready to be cured. Connect the smoke generator *A* with the drum of cylinder *D* by the tube *B*. Turn the crank *F* at a moderate rate, counting one minute more or less for each kilogram (=2.21 pounds) of milk to be cured. To ascertain if the milk has hardened, the probe or tester *K* can be inserted by taking off the tube *B*, but after a very little experience this will be unnecessary. The best of cured rubber can be taken out immediately or the next morning, cut apart, and hung up to dry.

The inventor recommends that each day's work be taken out so that the sheets will dry quickly, but several days' work can be continued and the sheet or belt will be equally pure but correspondingly thicker. The inventor claims that with the use of this machine the milk is evenly distributed over the inner surface of the drum and the whole force of the smoke utilized in curing it, not only doing so more quickly, but more uniformly, while (no small item to the producer) it economizes fuel, especially the urucury-nut, which is becoming scarcer and scarcer. The scarcity of this nut has induced rubber-gatherers to cure the sap with other palm-nuts much inferior to the urucury. Although not generally known, this is really one cause of the appearance of improperly-cured rubber.

The saving in urucury-nuts, which make the smoke, is

75 per cent. and a day's work for one man to gather (say 20 pounds of milk) can be cured more perfectly in ten minutes than it could be by the old system, which takes about two hours.

Comparing the limited surface of the small form heretofore used with the large inner surface of the cylinder, it is evident that in the first case the milk is unevenly poured on and irregularly smoked, much of the strength being lost in the air by being blown away, while in the latter the milk is evenly distributed over a larger surface, easily and uniformly reached by the full force of the smoke, and thoroughly cured.

Rubber cured by this machine has many advantages not only to the producer, but also to the manufacturers abroad, for many reasons, among which are the following: It reaches the manufacturers much dryer, with a mininum loss in weight; it is freer from impurities; it is in a regular thin sheet, which is very convenient for working up, instead of great, big chunks of irregular shape, which have to be cut up and are often found to contain impurities.

Another invention of Mr. Coutinho is an improved hatchet—shown in the picture in the foreground—for tapping rubber-trees, by the use of which no harm is done to them, for after the milk has finished oozing out the cut closes, and in a few days the wound is perfectly healed, whereas with the old hatchets, used for the past fifty years, the cut is irregular, pieces of bark are chopped out, damaging the trees and leaving an ugly wound, which only heals up after a long time, to the detriment of the growth of the tree and its milk-producing qualities.*

The first experiment made with Sr. Coutinho's machine was before the commissioner of public works and Colonization of Lands Society and was most satisfactory. In the report furnished to the governor of the state of Pará, Dr. Lauro Sodre, after explaining the manner of using, it was recommended highly, as profitable to the producer, economizing the much coveted urucury nuts, which cure most perfectly the rubber, and enforcing the use of the perfected hatchet as essential to the better preservation of the rubber-tree.

Samples of the cured rubber have been seen by experts in Pará and pronounced of excellent quality, dryer, more portable, making a saving in packing, and freight; and other samples have been sent to both the United States and England, and fully approved of by manufacturers who have seen them. Although this industry is in its infancy, it is most likely to take rapid strides, and no doubt the machine will be universally used, very much to the benefit of both producer and manufacturer. Sr. Coutinho is at the present time actively engaged in the nearer rubber districts with samples of his machine and has met with such success that he cannot manufacture enough to fill orders, and although it will take a long time to cover the rubber-fields in the immense valley of the Amazon, his success is considered undoubted.

* Mr. James Collins and other authorities have called attention to the fact that the injury to the rubber-tree from tapping comes from wounding the sap-wood, which is wholly unnecessary for the reason that the lactiferous vessels exist only in the bark. What is known as the "cambium layer" (composed of vitally active cells situated on the outside of each annual zone, and from which layers of bark and wood are annually elaborated and given off) suffers from the slightest wound. If this layer is injured decay ensues, and no new bark grows over the wound. It thus happens that the trunk of a rubber-tree frequently gashed by careless rubber-gatherers becomes a mass of wounds, leaving no place for sound milk yielding bark to grow. Even if life lingers in the tree for years—as is sometimes the case after the most reckless tapping—the bark ceases to yield milk for the reason here given. Mr. Collins experimented in India with knives of different forms designed with a view to damaging the tree less than the *machetes* which have so long been in use in the rubber-forests of Brazil. Other forms of rubber-tapping knives have also come into use in Ceylon, where rubber-tree culture has attracted so much attention. It is due to a desire to prevent damage to the trees that the hatchet here illustrated has been designed by Senhor Coutinho. By the way, this gentleman, who may be addressed at Pará, Brazil, is desirous of opening correspondence with parties in the United States with a view to having them manufacture the articles he has invented.—THE EDITOR.

A NEW PROCESS FOR RECOVERING RUBBER.

FOR some years past a gentleman in New England has been experimenting in the line of recovering rubber, particularly from old boots and shoes. His theory has been that some liquid could be used that would be less expensive than sulphuric acid and be entirely free from any of the injurious features that the latter might possess. The editor of THE INDIA RUBBER WORLD was recently invited to witness an experiment at his place in which old rubber shoes roughly cracked up were absolutely freed from fiber in the course of a very few minutes. The solution used is not an acid at all, but is rather of a saline nature. It was put in an ordinary iron vessel and heated slightly, when it at once took effect, thoroughly dissolving the cellulose. The first cost of the solution, so the experimenter affirmed, was slightly higher than sulphuric acid, but a point in its favor was that it did not lose strength by being used; also, that it could easily be washed out of the rubber, when, the excess of water being evaporated, it could be used over and over again. The experimenter said that the action of sulphuric acid upon whiting, one of the most common adulterants used in rubber shoes, was to turn it into sulphate of lime or gypsum, an ingredient that is far from advantageous in a rubber compound. The saline solution, however, did nothing of the kind, as it has no effect on anything except cellulose. A long course of experiments has proved that this solution thoroughly dissolves wool or cotton fiber, or indeed any fiber that may be found in vulcanized rubber. Some of the rubber recovered in this way was used and found to be of very superior quality. While in the solution the rubber was not attacked at all by the liquid, it did not swell, nor was there any trace of it to be discovered after the washing in water. Had there been a little of it left it would in no way affect the compound with which the recovered rubber might be mixed, and the recovered rubber seems to have a closer grain and to be in a better condition than that secured through the acid process.

TO PRESERVE BICYCLE-TIRES.

IN answer to a correspondent who writes to ask how to preserve rubber tires, the *Pharmaceutical Era* says: "There are no specific directions to this end so far as we are aware. No preparation can be applied to the rubber tire which will in any way preserve it. About the only suggestions that can be made are to remove the weight of the machine from the tire, either by suspending it, or by inverting it so that the weight may rest upon the handles and saddle. The same care necessary to ordinary rubber goods would hold in the case of rubber tires. Avoid extremes in temperature and use no oil, varnish, or other dressing to preserve the rubber. No special care other than as suggested would seem necessary."

THREE RUBBER-FACTORIES AND THREEFOLD PROGRESS.

The Works of the New York Belting and Packing Co.

IT has been said that when a manufacturing plant ceases to grow it at once begins to retrograde. With this truism in mind the editor of THE INDIA RUBBER WORLD accepted the invitation of General-Manager L. K. McClymonds, of the New York Belting and Packing Co., Limited, to visit their works and view the recent extensive improvements and alterations. Three separate factories are owned by this company and are kept constantly busy. The first appears on the scene bearing the modest title of "Factory No. 1."

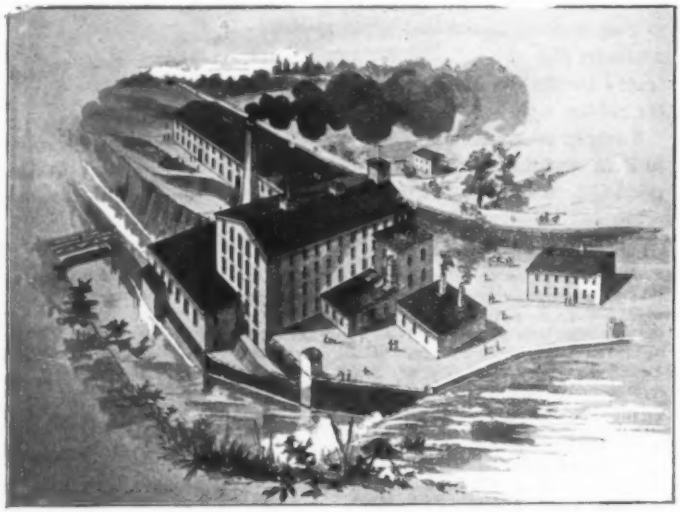
FACTORY NO. 1—NEWTOWN, CONNECTICUT.

This factory is situated in Newtown, Conn., has excellent shipping facilities, and has the advantage of an exceptionally fine water-power. The main building of this plant is a substantial brick structure five stories in height, 300 feet long, and 60 feet wide. Placed at right angles to this is a four-story addition, 77 feet long and 30 feet wide; close to which are separate buildings for engine-house, boiler-house, machine-shop, carpenter-shop, gasometer, storehouses, etc. In plain sight of the factory plant are the handsome house of the superintendent and forty neat cottages for the workmen, all of which buildings are the property of the company. Viewing this city of rubber workers built by the side of the swiftly flowing river, with lofty pine-clad hills rising almost to the majesty of mountains on either hand one cannot fail to be struck by the beauty of the scene, and impressed by the prevailing air of thrift and enterprise.

Entering the factory while the huge turbines are in motion, one sees the washing, mixing, and calendering of rubber on scores of machines, many of which are new and have labor-saving attachments that are not only up to date but in some cases far ahead of what we had dreamed of. Enormous hydraulic presses for belting, packing, and matting are here to be seen, and at the time of our visit another 30-foot monster was being set up. Not the least interesting part of the plant is the new hose room. It is a light, airy, spacious apartment, where everything from start to finish is done by machinery. In this room a very few men are able to turn out 25,000 feet of hose a day, producing an article that is infinitely superior to hand-made hose. As Mr. McClymonds pertinently remarked, "The belting cured under pressure is superior to the old-fashioned article that was made before we had belt-presses. So we now make our hose under pressure and find a vast improvement in its quality."

Perhaps the most marked feature in the line of improvements that the factory exhibits is the careful avoidance of unnecessary handling of goods. It is only recently that rubber-manufacturers have found this necessary, but to-day all of the progressive ones look to it most carefully. Here the problem is solved simply and satisfactorily. The raw material enters at one end of the mill and is delivered at the other in the shape of finished product. Factory No. 1 employs about 600 workers and 600 horse power.

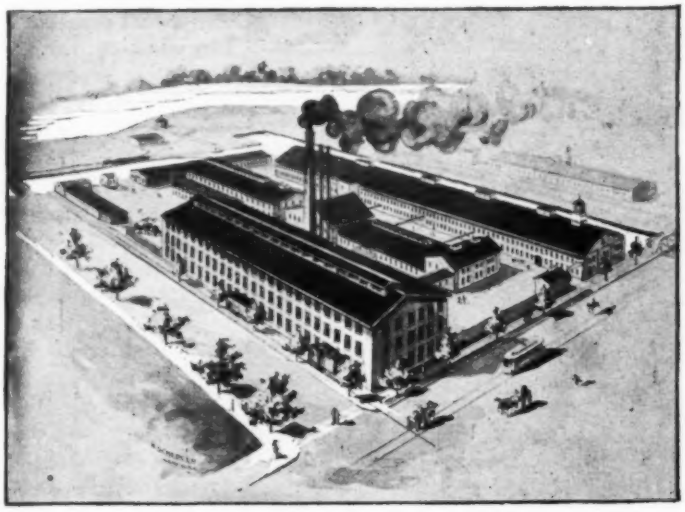
Factory No. 2 is not as large as that just described, and indeed is used chiefly as a helpmate for it. Here much of the raw material is prepared. It has recently been fitted with new grinders, conveyers, centrifugal machines, vul-



FACTORY NO. 2—NEWTOWN, CONNECTICUT.

canizers, etc., and is capable of turning out an immense amount of stock with little handling and few hands. The two brick buildings—one of five stories, 74×50 feet, and one two stories, 124×40 feet—are situated close to the river that turns the wheels of Factory No. 1, and have both water and steam to rely upon for motive power.

Factory No. 3, with the best-equipped plant of all, is situated at Passaic, N. J. The buildings are of brick, the larger being 390×60 feet, and the other 250×60 feet. Here is made the finer class of goods in mold work and specialties. As one steps from the office into the main building the whole process of manufacture is in sight. At the farther end, nearly 400 feet away, is the compounding-room, where the rubber and ingredients added to it are weighed. Nearer are the mixers, still nearer the calenders, close at hand the presses, and then come the tables for the finishers, and then the shipping room. Interspersed among the machines mentioned are varied mechanisms for the saving of labor, and more are being added every day: a pneumatic device for slipping jar-rings from a mandrel and forcing another tube on at the same time, a curious cage that is full of cords of rubber in which revolves a knife, cutting them into convenient bits for mold-filling —these, and a score of others, new, automatic, and effective. The floors above are devoted to the making up of various goods and the storing of supplies, while the topmost story is a vast dry-room where hang thousands of dollars worth of Pará rubber, going through the expensive, but most satisfactory, process known as "air-drying."



FACTORY NO. 3—PASSAIC, NEW JERSEY.

The second main building, just completed, is most substantially built. A part of the lower floor is used for a shipping-room, and another portion for a mixing- and calendering-room. The floor above is devoted to the manufacture of pneumatic tires, and is one of the most complete and conveniently arranged departments possible. The floor above this, in turn, is a *fac simile* of the splendid hose-room at Factory No. 1, and like it has a capacity of 25,000 feet a day.

A department of special interest in this factory is the emery-wheel section. Here is a complete plant, consisting of mixing mills, calenders, presses, molds, vulcanizers, lathes, diamond-pointed tools, and a host of special devices for use in the manufacture of vulcanite emery-wheels. All kinds of wheels are made, ranging in size from a cheese-box down to a lozenge, and using emery grains as coarse as rice or almost as fine as impalpable powder.

Factory No. 3 is run by water-power, although it is fitted with engines in case of a scarcity of water. The aggregate is put at about 1800 horse-power. Electric lights are in use all over the plant, and a new system of piping is being put in place. In addition to this a new system of shafting and gearing is being installed. In this factory, as in No. 1, the unnecessary handling of goods during manufacture is carefully avoided. Said Manager McClymonds as the tour was ended:

"The New York Belting and Packing Co., Limited, has a wonderful name. It is known the world over, and is a synonym for first-class goods. I want to say that I value that reputation so highly that under no circumstances shall there be any cheapening of its products. Where we can see chances to improve we shall do so. New processes, new machinery, better results, we welcome, but there will be no lowering of grades, no attempted economy in the use of rubber, no misuse of adulterants."

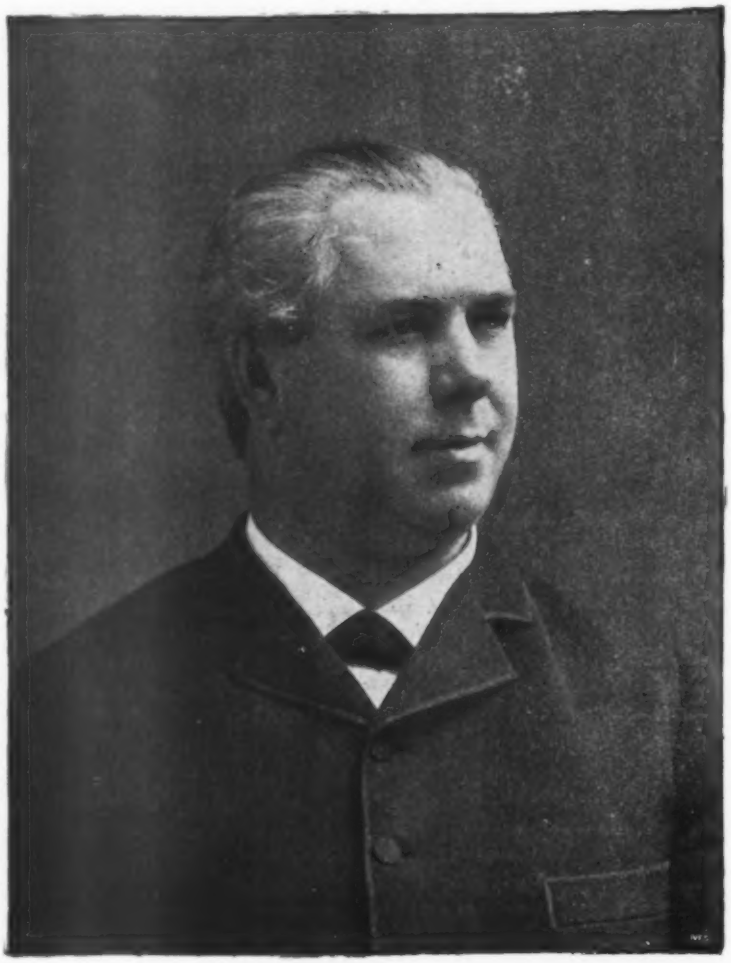
AN ENGLISH RUBBER COMPANY'S BUSINESS.

THE thirtieth ordinary general meeting of the India-Rubber, Gutta-Percha, and Telegraph Works Co., Limited, was held in London on February 15, Mr. S. William Silver (chairman) presiding. The accounts showed the net profit for the calendar year 1893 to have been £94,607 4*s.* 2*d.* In spite of the stagnation of trade, which had not been without its effect upon the company's business during the year, a dividend was declared which, together with the dividends previously declared, equalled 12½ per cent. for the year. The reserve fund, it was stated, amounted to £450,000, which would enable the company to pay dividends, even if a bad year should come in which no profits were earned. During the year little was done by the company in submarine telegraph work, the last important example of such work having been the laying of the cable on the west coast of South America. The company have relied rather upon the sale of material for engineering purposes. The company have completed their contract for the electric lighting of the city of Brussels. Mr. Matthew Gray, managing director of the company, spoke of the satisfactory character of the work done on that contract, and reported that the central station erected in Brussels was the best that he had seen. The factories of the company at Persan-Beaumont (France) and Silvertown were well maintained and fully employed. They turn out a great variety of articles and a great many of each sort. For instance, they have 500 girls employed at Silvertown on bicycle-tires alone.

THE *Castilloa* genus of rubber-producing trees was so named after Don Juan del Castillo, a Spanish botanist, who died in Mexico in 1793.

THE PRESIDENT OF THE UNITED STATES RUBBER COMPANY.

THE most conspicuous and remarkable figure in the rubber-shoe business to-day is Joseph Banigan, president and general-manager of the United States Rubber Co. Born in 1840, he early learned that he must depend upon himself for whatever of success this life might yield him. His maiden effort at self-support was in the jewelry business, which trade he pursued until he was accounted an expert manufacturing jeweler. When about thirty years of age his attention was attracted to the rubber business, which was then just beginning to be developed. So interested did he become that he forsook his trade, accepted a position at $10 a week with John Haskins, who managed the Goodyear India Rubber Stopper Co., and agreed to work at that rate for a year. The factory was a very modest plant, indeed, located on Eustis street, Roxbury, Mass. There was but one room, and at first but one small grinder, but later another was added, and, later still, a calender. Three months served to so glut the market with stopples that there was a sudden cessation in manufacturing. Mr. Banigan then proposed to the partners in the concern that they lease the mill to him, to which they agreed. He at once started out, secured orders on other work, returned to the factory, made the goods and saw them shipped,—in fact acted as salesman, superintendent, and factory help, and so well did he do it that his 5 per cent. commission for the first year netted him $1500. This influx of energy and orders so improved the business that the Roxbury quarters were felt to be too small, and a move was made to Jamaica Plain, Mass., where the plant was used that is now the property of C. M. Clapp and known as the Ætna rubber-mills. They put in the small engine that had been used at the other place and started up. Messrs. Blake & Haskins, the proprietors, made a new arrangement with their energetic young superintendent, paying him a salary of $1500 a year, and employing Mr. Burr, father of the former superintendent of the Pará Rubber Shoe Co., as selling-agent. A large variety of goods was then taken in hand such as camp blankets, clothing, and sheetings, many of the goods being cured by an acid process and sold in competition with the Goodyear goods that were protected by patents.



JOSEPH BANIGAN.

During all the time that he was superintending the rubber-mill Mr. Banigan was broadening his knowledge of rubber in a manner that to an observant eye must have indicated his future. At home he had a room fitted up to experiment in, and was up at 5 in the morning and at work. A process that he invented for curing wringer rolls without sulphur netted him $3000.

In 1864 he went to Woonsocket, R. I., and helped to form the Woonsocket Rubber Co. The stockholders were Joseph Banigan, Hon. Lyman A. Cook, and S. S. Cook. They borrowed $10,000, hired an old sash-and-blind factory, dug through eight feet of shavings to set their machinery, and began work. They had two grinders (15×36), one four-roll calender (20×54), and a 15-horse-power engine. When both grinders and calender were running the engine was apt to slow up and stop, when all hands would rush to the fly-wheel, pull it down past the center, and the motive power thus assisted would run a while longer without balking. The goods turned out at that time were blankets

and wringer-rolls. The new company made money, and in a short time put in a 30-horse-power engine, which they were satisfied would do all of their work. But as the business grew more grinders were added, and ere long the new engine had more than it could carry. About this time the Woonsocket Rubber Co. was incorporated with $100,000 capital, a new factory was built, new rubber machinery added, an 80-horse-power engine set up, and the manufacture of rubber boots and shoes begun. In a short time the capital was increased to $200,000, and as the 80-horse-power engine was becoming overworked, a 350-horse-power engine was put in. Then as the "new mill" was far too small, another factory was built and fitted with new machinery throughout. The next step in advance was the building of the Millville (Mass.) factories, the only ones in the world devoted solely to the manufacture of rubber boots. After this followed the elegant "Alice" mill at Woonsocket, a model of which, together with the Woonsocket and Millville plants, attracted so much attention at the World's Columbian Exposition.

GEORGE WATKINSON.

In addition to these great manufacturing plants Mr. Banigan created the Marvel Rubber Co. and was a large owner in the Lawrence Felting Mills. All of the five plants just mentioned are now in the United States Rubber Co., but outside of this Mr. Banigan has large interests. Among those are the American Wringer Co., a prosperous daily newspaper, a large sheep-ranch in California, and numerous others. The investments which he deems as wise as any are those which, strange to say, pay him no dividends except the blessings of the unfortunate. Among these are the Home for the Aged of the Little Sisters of the Poor, and a Home for Working Girls, both of which are situated in Providence and which cost the donor hundreds of thousands of dollars. These institutions are open to the needy of whatever creed or nationality.

In May, 1893, Mr. Banigan was elected president and general-manager of the United States Rubber Co. Since that time he has devoted himself to the problem of increasing the effectiveness of the various plants and utilizing the special genius that so many of his associates possess. In this he has shown himself an able general, and when one considers the many difficulties of the task, the progress of the United States Co. toward perfection in administration is indeed marvelous.

* * *

THE ASSISTANT MANAGER.

THE gentleman who has been chosen as assistant to Mr. Banigan, as manager of the United States Rubber Co., is probably as well known to the rubber-shoe trade as any man living. His career has been most interesting and he has enjoyed a measure of success that is accorded to few. George Watkinson was born in Brooklyn, N. Y., in 1838. As a boy he worked in a ship-chandler's store in New York and afterward was for a time in the office of a transportation company. His first experience in the rubber business was with Henry Elliott, in New York, in 1860. Elliott was the agent of the National Rubber Co. in those days, New York state being part of their territory. As a salseman of these goods young Mr. Watkinson made his bow to the jobbers, and among the first to appreciate his abilities was W. L. Sage, then in Rochester, N. Y. Mr. Sage thus speaks of his first acquaintance with the subject of this sketch:

"It must have been in 1863; at least it was at the time when Deacon Southwick of Boston used to come up our way with a little grip of sample rubber shoes and stop for our order. He would never allow that he was out for that purpose, but claimed that he was on his way to see Niagara Falls and stopped over 'accidental like.' My first distinct recollection of Watkinson is his coming into our store with a brisk step and a twinkle in his eye and announcing that he was *not* out to see the beauties of the falls, but to sell rubber shoes. He did sell us, and we have traded with him ever since."

In 1871 Mr. Watkinson took the selling-agency of the Candee Rubber Co. At that time the company were doing a conservative business, but were willing to extend it, and for that purpose secure the best talent that the country afforded. They made no mistake in securing Mr. Watkinson, nor did he in going with them. The management stood behind his every move and the result was that he brought their sales up to $2,500,000 a year. An instance of his methods is cited by a friend. Ohio was not using as many of the Candee goods as he thought the state ought to use. He therefore went to the leading jobbers there and in their company visited the retailers and himself

secured their orders. Mr. Watkinson has kept up with, and often ahead of, his business. He has, for instance, complete records of all the rubber boot and shoe patents that have been issued. Further than this he has been the designer of many of the most popular styles. When the strap sandal was in vogue he brought out the imitation sandal, which grew into the croquet. The "Elm City" shoe, cut high front and back, is a type of shoe which was invented by him and is to-day one of the most popular in the market for women's wear. He was also the first to put specialties in individual cartons, and he first brought out the "perfection" lumberman's shoe. His latest success is the Colchester Spading boot, which has had an enormous sale.

In 1888 Mr. Watkinson organized the Colchester Rubber Co., and later the Rubber Manufacturers' Selling Co. In building up the Colchester Rubber Co. he was not only its president, but was actually purchasing-agent, financier, superintendent, and sales-agent. He daily did an amount of work that would have floored most men and, overcoming difficulty after difficulty, he succeeded by sheer ability and indomitable energy. His experience, particularly in making the Colchester a success, will be of untold value in his new and responsible position.

THE MAKER OF THE FIRST RUBBER SHOE.

*By Francisque Sarcey.**

DO the bicyclists know it? I do not think so. It is altogether probable that they to day are precisely where I was yesterday; if any one should ask them to whom they are indebted for the rubber of their pneumatic tire, they would be much embarrassed for an answer.

India-rubber! Why, it seems as if it must always have existed. How did we ever live without an article whose uses are now so numerous and varied?

Well, the invention of India-rubber is not much more than a century old. Understand me, I say the invention. The potato existed long before Parmentier invented it. But to him belongs the honor of having overcome the repugnance of his contemporaries who were unwilling to eat it, of having revealed to them that it was one of the healthiest, most nourishing, and most savory of dishes; and that is why it is said, justly enough, that Parmentier was the inventor of the potato.

Who was the inventor of India-rubber? It is known in a vague way that a certain Fresneau was the first to concern himself about it. But his name was so thoroughly forgotten that it does not appear in the biographical dictionaries, and even those casually mentioning it are doubtful as to its spelling.

Well, a little book has just appeared which repairs this injustice. Its title is "Les Origines du Caoutchouc et François Fresneau" (1703-1770), and its author is the Baron de la Morinerie.

M. de la Morinerie, by an examination of the marine records, has established the history of this discovery and legitimately awarded the glory to François Fresneau, engineer to the king.

He, however, was not the first to speak of India-rubber. Priority in this respect belongs to La Condamine, the celebrated traveler, who, in an account of his explorations of the interior of South America, notes the singular properties of a resin which the natives, he says, call *cachuchu*. When fresh, it can be molded into any form desired, and the rain does not penetrate it. But its most remarkable quality is its great elasticity.

The good La Condamine admiringly relates that the Omaguas use this material to make pumps or syringes that dispense with the piston. These have the shape of a hollow pear, with a little hole at the tip, into which is fitted a wooden pipe; when filled with water, they act under pressure like an ordinary syringe. This utensil is very popular among the Omaguas. When they assemble for a banquet, the host never fails to present one, out of politeness, to each of his guests, who uses it before sitting down to table. Each people has its own customs. This one struck La Condamine as curious, and the passage referring to it, when read before the Academy of Sciences, was received by the illustrious assembly with a unanimous smile. No one, not even La Condamine, foresaw the manifold employments of which this resin, assuming all shapes with such suppleness, was susceptible.

Fresneau was the first to bethink himself of the services which it was capable of rendering. He had been sent to Guiana, with the title of king's engineer, to perfect the defenses of Cayenne; for a European war was then in progress, and the English were jealous of the French colonies. Justice should be done to the minister by whom Fresneau was selected, for at best he will bear but a sad name in history. This minister was M. de Maurepas,—a courtier rather than a great statesman. But he had an open, agile, and subtle mind. He advised Fresneau, with whose taste for natural history he was acquainted, to collect new species for the Jardin des Plantes and to keep him informed of the results of his searches.

Was Fresneau familiar with La Condamine's memoirs? Had he held in his hands any of those syringes which the learned traveler had brought back as amusing playthings? At any rate he had no sooner landed in Guiana than he began to search for the unknown and nameless tree containing this marvelous resin.

He began by studying all the trees of Guiana that discharged a milky substance; but none possessed the singular properties which had struck him so forcibly.

A chance came to his aid. Some Indian fugitives had landed at Cayenne from a canoe. He entered into relations with them, and asked them if in their country they knew the *cachuchu*. They described it to him, and at his

*Translated from *Le Radical* (Paris), for THE INDIA RUBBER WORLD, by Benjamin R. Tucker.

request they made him a clay model of the fruits, by which he could recognize it.

Furnished with these indications, Fresneau started through the forests of Guiana with negro hunters, promising them brandy if they should succeed in discovering the famous tree. One of them finally found a single tree in Apronague. There Fresneau learned from the natives that the same tree is abundant along the banks of the Matarussi. He went up the river during the night and found not only one tree, but a forest. Here he made the first pair of rubber boots that the world ever saw.

When he returned to France, intoxicated with his discovery, M. de Maurepas, his protector, had fallen from the ministry. Fresneau had to offer his boots to the new minister, an industrious but unprogressive person. The department answered the engineer's communication with vague compliments, which are a sort of political holy water.

This poor Fresneau, to gain attention, took step after step, wearing himself out without gaining glory or profit. Another *savant*, named Macquer, who is now as unknown as Fresneau, discovered a way of dissolving the elastic resin by the aid of ether, so that, to use his own language "it may then dry and retain all its elasticity." This Macquer had the good taste to speak in terms of praise, in his communication to the Academy, of the work of Fresneau. His memoir nevertheless was forgotten, and it was left for a pious hand to brush off the dust and pay our debt of gratitude to these conquered pioneers.

What sad reflections are suggested by M. de la Morinerie's little book! Here was an honest man, who, in a life of useful labor, showed the vision of a genius, who followed it with marvelous perseverance, who succeeded, and who has endowed us with one of the most useful implements of modern civilization, and his very name has perished! The Greeks were less forgetful than we are. They knew that Triptolemus was the inventor of the plow. You will answer me that probably Triptolemus never existed save in their imagination. What of it? They thought that so useful an invention should not remain an anonymous work. They wanted somebody to thank. The Greeks knew that Prometheus snatched fire from heaven; we do not know to whom we are indebted for friction matches.

HAS GUTTA-PERCHA UNIFORM ELECTRIC QUALITIES?

By J. Lagarde (in Annales Télégraphiques.)

I HAVE lately been able to procure a sample of copper covered with Gutta-percha extracted from the leaves of the *Isonandra* by M. Eugené Serullas's process. The insulation seemed very high, but I was unable to measure it, the length of the sample being only 1 meter. I was therefore obliged to confine myself to analyzing the Gutta-percha, the analysis giving the following results:

Water	Nil.
Impurities	0.8 per cent.
Resins	16.0 per cent.
Gutta-percha	83.2 per cent.
	100.0 per cent.

I separated out the resins and found this result:

Fluavil	1.72 per cent.
Alban	14.28 per cent.
	16.00 per cent.

The large amount of alban as compared with fluavil, and especially the absence of water, are sufficient to account for the high specific insulation attributed to this dielectric, notwithstanding the large proportion of Gutta-percha. I am, moreover, inclined to think that by reason of the absence of water this Gutta-percha will oxidize less easily than those brands which have hitherto been used, and consequently that it will last longer.

As the facilities that have been afforded me for investigating the properties of Gutta-percha are about to fail me, I am, to my great regret, obliged to relinquish the study of this question, as well as that of many matters affecting telegraphy. Nevertheless, what I have published on this subject seems to me sufficient to show what are the effects of water and resins on Gutta-percha. Water diminishes its insulating power and facilitates its oxidation; the resins, especially alban, increase its insulating power, but at the same time are a source of deterioration. Two submarine or subterranean cables, covered with very different Gutta-perchas, may at a given moment show the same insulation; but that in which the Gutta-percha contains less water and resin, will remain sound for the longer time. Analysis, therefore, presents itself as the only means of discovering whether the Gutta-percha on a cable is of good or bad quality, and it is because analyses were not carried out a few years ago—that is to say, previous to my investigations—that some submarine and subterranean cables of bad quality were accepted, which, nevertheless, fulfilled the specified electrical conditions. The cores of the submarine cables deteriorated so much after a few months' sojourn under water that it was impossible to use them. As to the subterranean cables, the insulation of several lengths appreciably decreased before they were put into use, and some could not even be employed at all. Moreover, at the time when the interurban underground network was being laid down, it sometimes happened that on soldering up two cable-ends in somewhat cold weather the Gutta-percha cracked. This must have been caused by the large quantity of alban contained by the Gutta-percha, and not as I suggested when consulted at the time.

It would be a useful termination to my investigations on Gutta-percha if I could answer the following question: Has pure Gutta-percha coming from different sources identical electrical qualities? To solve this question it would seem a natural thing to do to cover copper wires of the same diameter with the same thickness of dielectric, and then to measure the insulation and capacity. But to do

this it would be necessary to raise the Gutta-percha to a somewhat high temperature at which it might oxidize. So that it would seem to me better to reduce the Gutta-percha to very fine sheets of the same thickness, and to make condensers instead of cores, and I employed this method some little time ago when testing two samples of pure Gutta-percha, one of which came from a very good and the other from a very bad source. I was not, however, able to obtain any results owing to the small amounts of Gutta-percha at my disposal, and the test must be renewed. The numerous experiments that I have carried out, only a few of which have been published in the *Annales Télégraphiques*, had to do with Gutta-percha of all kinds coming from seven different factories. The results were always similar, which leads me to believe that the various pure Gutta-perchas the samples contained had the same electrical qualities. I cannot, however, assert this. If, on the other hand, this is not the case, my conclusions as to the influence of water and the resins, and as to the necessity of determining the amounts of these substances that are contained in the Gutta-percha of a cable, would in no way be affected; indeed, analysis would be all the more necessary, since electrical tests would tell us less about the value of the Gutta-percha employed than they would if all kinds of pure Gutta-percha possessed the same qualities.

In conclusion, I will repeat that I consider tolerably good Gutta-percha to be that which contains at least 55 per cent. of pure gutta, and at the most 5 per cent. of water and 1 per cent. of foreign substances, and in which the amounts of alban and fluavil are equal. Good Gutta-percha should contain at least 60 per cent. of pure gutta, and at the most 5 per cent. of water, and 0.8 per cent. of foreign substances, the amounts of alban and fluavil being equal. Finally, Gutta-percha of very good quality should contain at least 65 per cent. of pure gutta, and not more than 3 per cent. of water, 0.5 per cent. of foreign substances, and 12 per cent. of alban.

AMERICAN VS. GERMAN FACTORY METHODS.

THE elaborate account in the last INDIA RUBBER WORLD of Dr. H. Traun's rubber-factories and his methods of dealing with his employés, suggested the propriety of submitting to the American rubber-manufacturers the question as to why similar methods and arrangements are not pursued by them toward their American workmen. Any one who reads the account of Dr. Traun's philanthropic undertakings is favorable impressed with this liberal and generous policy of enlisting the workmen's loyalty and fidelity by looking out for their wives' needs and interests, and the query arises in his mind, "Why should not we copy these methods here?"

The answers of the leading American rubber-manufacturers may be summed up as follows, the views expressed being substantially those of Mr. A. Spadone, president of the Gutta-Percha and Rubber Manufacturing Co. (New York):

While Dr. Traun's policy is very commendable, it would be a mistake to suppose that it is either wise or expedient in this country to imitate him. Everything depends on the general economic and political conditions. Germany is a country with a strong, centralized, paternalistic government, and every relation of life reflects to some extent this paternalistic view. The German workman feels himself to be, and is treated by the officials and employers as, an inferior, a dependent, as one who cannot aspire to equality with his employer. Having this feeling, he likes to receive favors and is grateful for any generous arrangement his employer makes for his old age, for his children, or for possible misfortune. The employer who is kind and considerate is doubtless happy in trying to improve the condition of his workman, while the workmen appreciate his efforts and reward him with industry and loyalty. There is something pleasant about such a relation, but after all it is semi-feudal. In this country, the workman does not expect the employer's charity, would not appreciate it, and might even resent it as a tacit denial of his equality and independence. If American employers do not, as a rule, organize old-age funds, sick and entertainment funds, and similar things, for their workmen, it is not because they are hard-hearted or because they are so absorbed in money-making that they do not concern themselves about the life of their workmen. The reason is that the relation between our manufacturers and workmen is strictly one of free contract. Each party to the agreement feels independent and free, well able to take care of himself. The workman expects and insists upon fair wages, for which he knows he is expected to give good work. He does not want any charity from his employer. The sentiment of personal loyalty has no room in such a relation. The employer desires to be free to discharge any man who is not entirely reliable, while the workman wants to be free to go anywhere at any time if by so doing he can better himself. In short, the contract between an employer and employé does not differ here from any other contract, where a quid pro quo is given and nothing over and above it thought of by either party.

Such a condition is certainly a higher one than the semi-feudal condition of the German laborers. Our workmen provide for their own needs, without difficulty. They have their lodges, unions, societies, amusements and pay their own way. In time, when Germany shakes off her militarism and paternalism, the relation there will also tend to become one of free contract.

This is in the first place. Another consideration is that our workmen get higher wages and simply do not need the generous assistance of the employer. In Germany, wages are lower and the standard of living lower, and the workmen would be unable to enjoy many of the comforts of life if employers did not provide them. Here the standard of living is high and wages correspondingly high. The workmen can afford to do without the employer's aid.

A COMMERCIAL COUNTERPLOT.

SCENE: *Private office in* CLOSEBUYER'S RUBBER EMPORIUM. *Time* 1.15 p. m.

MR. CLOSEBUYER—About time one of those drummers came in to get my rubber order. (*To Stenographer*)—Miss Keyboard, I expect a couple of traveling men to-day, and I wish to warn you against getting acquainted with them. The girls of to-day are altogether too ready to allow soft young men to spend money for flowers and theater tickets for them, and, speaking plainly, that is but a shade better than bunco-steering. Certainly, as you care for none of them, it is obtaining money, or its equivalent, under false pretences. (*Recollects that he has promised to telephone a particular friend. Makes for the telephone. Stenographer bites her lips and looks angry. Enter Charlie Bigheart.*)

MR. CLOSEBUYER (*hearing the noise and laying it to the stenographer, says crossly*)—For heaven's sake, keep quiet. Don't speak or move unless—Hello Central, give me 1440. Is that you Tightfist? Say, Bigheart, of the Pure Gum Co., and Treater, of Sterling Rubber Co., are due here to-day. I have got to place an order with one of them. They have *carte blanche* from their houses to spend any money necessary to get trade. Want to help pull their legs?

STENOGRAPHER (*in alarm*)—Mr. Closebuyer! (*Enter Jim Treater.*)

MR. CLOSEBUYER (*sharply*)—Sit down out there and keep still! (*To friend*)—Oh, they are ordinary flashy drummers. Bigheart is soft. I work a nickel cigar on him and get back a fifteen-dollar dinner. Treater likes whiskey, and I load him up and then he insists on buying the town and won't let me pay a cent. (*Bigheart and Treater look fierce.*)

STENOGRAPHER (*in agony*)—Mr. Closebuyer, one minute—

MR. CLOSEBUYER—I will not be interrupted if the store is afire—go get your lunch—not a word! (*Stenographer departs.*) (*To friend*)—O, yes, I can keep them here for three or four days if necessary. They are deadly enemies and will cut prices down to the last notch to get ahead of each other.

(*Bigheart looks foolish and Treater furious.*)

MR. CLOSEBUYER—No, they wont tumble if a house falls on them. I have had them this way for two years past. If they were not fools they would patch up and divide the business, but no fear of that.

(*Bigheart and Treater nod to one another and shake hands.*)

MR. CLOSEBUYER—Well, I must get out to lunch. Shall eat light as one of my expected callers has got to furnish a swell dinner to night. Look in about five, and I will see that you are included in the invite. Oh, by the way—

(*Bigheart and Treater silently depart.*)

[AN HOUR LATER.]

(*Enter Charlie Bigheart with his most cordial manner.*) How do you do, Mr. Closebuyer? Stopped off to see you for a few minutes. Wanted to give you a pointer. Get thunder from our house if they knew I was here. They want the Sterling to furnish you with goods for the next year, so I thought I would say a good word for Treater.

MR. CLOSEBUYER—What's the matter? Isn't my credit good?

BIGHEART—First class, but the old man says it costs too much to sell goods to you, and he had rather let his competitors have your trade.

MR. CLOSEBUYER (*shortly*)—All right.

(*Enter Jim Treater*)—Hello, Bigheart! Evening Mr. Closebuyer! On my way West. Thought I would tell you to nail Bigheart for your regular supply this year. We can't fill orders, and are putting up prices. Besides I got called down for spending so much cash in this town, and I have orders to skip it.

MR. CLOSEBUYER (*excitedly*)—But hang it, I must have the goods!

TREATER—Get them of Bigheart.

BIGHEART—Get them of Treater.

MR. CLOSEBUYER (*pathetically*)—Boys, I shall lose the best of my year's trade. You must help me out.

BIGHEART (*taking Mr. Closebuyer aside confidentially,*)—Fill Jim up on cheap whiskey. He will do anything for you then.

TREATER (*taking Mr. Closebuyer aside confidentially*)—Give Charlie a nickel cigar—that will fetch him.

MR. CLOSEBUYER (*sotto voce*)—They must have been on the line when I was telephoning Tightfist. (*Aloud*) Boys, suppose you divide my order this year. Make the price as light as you can, and by the way, the dinner to-night is on *me*.

PNEUMATIC SHOES AND MATS.

PARAGRAPHS as to pneumatic shoes are going the rounds of the cycle press. Louis Melden, of Dublin, patented the idea a year or two ago, and we believe he intends going on with the matter. It is quite within the bounds of possibility that a pneumatic shoe should prove a complete success. While dealing with this subject we may mention that Sidney Lee has patented a pneumatic stair-carpet, or rather a sort of pneumatic mat, which goes under the stair-carpet. It is formed of one length of tubing which goes backwards and forwards lengthways, and which is inflated through a single valve. The pressure is consequently the same all through, and there is no unpleasant rolling under the feet, as there would be were a tube not used. According to his report this mat feels most delightful under the feet. In a house where there are children, we fancy it would save many a bruise from tumbling down stairs. There is another pneumatic idea which Sidney Lee has turned his attention to—it is that of billiard-cushions. Some two or three years ago the principle was patented by Mr. A. M. Toomey, but after much experimenting he failed to overcome various difficulties, such as keeping the pressure equable in the cushion when the temperature varied. Mr. Lee believes that he has got over this difficulty, and the two will probably join forces. At present billiard-cushions are made of solid rubber, which not only becomes dried up and stiff from cold, but deteriorates as time goes on. An air-cushion would not suffer from these defects, and would be always true. There is money in the idea if it could be brought to a successful issue.—*Irish Cyclist.*

THE Boston Belting Co. are running on full time and report very satisfactory orders in spring trade.

INDIA-RUBBER SCRAP.

A RUBBER-CLOTHING manufacturer says of cravenette: "I regard its present popularity as simply a fad. It is really no more waterproof than any other kind of close-woven goods. It is claimed that it is not made in America, but that is a mistake. The cravenette formula is simply a combination of alum and soap, with which the goods are treated, and has been long used. I look for it to go out of fashion speedily, for a light rubber coating on cloth is far preferable, and people will soon recognize it. They will find that a rubber waterproof *is* waterproof, whereas cravenette is sooner or later a disappointment."

* * *

INDIA-RUBBER manufacturers who have been in the habit of buying silicate of magnesia,—in other words, "asbestine,"—will be interested to know that a consolidation has been effected among all but three of what are known as the talc-mills in Gouverneur, N. Y. It is said that the price of asbestine will be advanced. The fact that there are three concerns outside of the trust, however, may have an effect in keeping prices down.

* * *

THE pleasantries that occur in business life are almost always fully appreciated by business-men. For example, *Puck* pictures a lean, scrawny billy-goat, holding a rubber shoe in his mouth, and offering it to a supercilious appearing nanny-goat with the remark, "Won't you have a bit of this delicious overshoe?" To which she very properly replies, "No, thank you; I never chew gum." In *Puck* it was not especially noticeable because of the surfeit of good things therein contained. But when a prominent New York retailer put it at the head of his advertisement in the dailies everybody laughed, particularly when the wily advertiser suggested that "nanny" was in no danger as rubbers contained little gum anyhow, but that his 85-cent shoes were the quintessence of rubber compared with average overshoes.

* * *

SPEAKING of successful efforts in advertising, a beautiful picture that is hanging in many an office to-day is one of the best. It represents a maiden clothed in silks and costly furs, with magnificent chestnut hair, glorious brown eyes, and fine Greek features. Just such a woman as would command attention, nay homage, wherever she might go. It would indeed be a cold-blooded man who would consign her image to the waste-basket. Nor do they. On the contrary, the picture is conspicuously hung, and so sweet is it that it wears unrebuked the following:

DIANA.

A huntress of immortal fame
Now coupled with the Goodrich name
—for orders.

* * *

A TALE appeared in THE INDIA RUBBER WORLD not long since concerning a horse-clipping experience enjoyed by Mr. F. T. Alden of the Boston Belting Co. It appears that a gentleman in Providence, R. I., read the story and as a further joke on Mr. Alden, whom he knows well, shipped him a rabbit that had long been dead, with the written instructions: "Please clip, and return without a blanket." Whether or not the recipient tried his clipper upon the rabbit has not been learned, but there is one thing that these stories go to show and that is that Mr. Alden is one with whom the trade like to joke,—the best sort of recommendation for a salesman.

IT is a curious fact that nine men out of ten, when buying cigars, place their money on the glass of the show-case rather than on the pretty rubber coin-mat. At first the cigar-dealers believed that the advent of the mat would do away with scratched and dented glass plates, but they have given up that hope now. The dealers themselves of course use the mat when they return change and the customer appreciates the convenience of having the coins lie in such a position that he can easily pick them up. Nevertheless, so curiously inconsistent is man that while he waits to be served he invariably fingers the mat, rests his wrist upon it, and pulls the points to see them snap back. Every now and then a point comes off and the mat is so much the less effective. All agree, however, that the mat is a good thing, although their only use of it may be a misuse.

* * *

IMAGINE a progressive retail shoe-dealer with a window dressing like this: As a center-piece a hugh rubber boot that, like a Christmas cornucopia, overflows with miniature boots. On the right in a graceful quarter circle are ranged medium-sized rubber boots with the legs made of bronze, green, and black rubber. On the left a similar quarter circle containing boots with white, blue, and seal brown legs. Scattered between these pairs of boots and arranged on the plush window mat in front of the half circle of boots are foot-holds, sandals, croquets in great variety, in all colors, and put upon gilded lasts to keep them in shape. Such an exhibit ought to attract attention and it does. It is a *fac-simile* of the World's Fair exhibit of the Colchester Rubber Co. and is furnished to the customers on application.

LIKE A ROLL-TOP DESK.

DUDLEY with his swell mackintosh is considered the best-dressed man on the avenue.

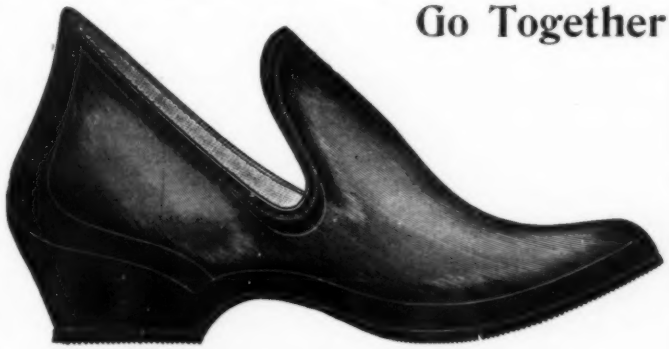
But oh, what a difference when it's off.

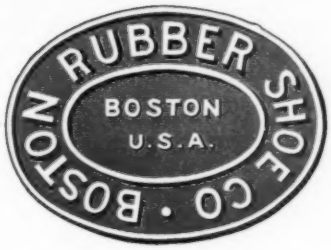
[FROM "JUDGE."]

A Good Name
For a Good Shoe.

These Two Always

Go Together





If they are Genuine.

NAME AND SHOE, STORM SLIPPER.
SHOE AND NAME, BOSTON RUBBER SHOE CO.

THE NAME 7,450,992 times on 3,725,496 pairs of

STORM SLIPPERS

Sold in Three Years.

BOSTON RUBBER SHOE COMPANY,

EXCLUSIVE MANUFACTURERS.

CONTRIBUTIONS TO THE CHEMISTRY OF INDIA-RUBBER.

By P. Carter Bell, F. I. C., F. C. S.

I.—THE EFFECT OF VEGETABLE AND MINERAL OILS ON INDIA-RUBBER. (CONTINUED FROM JANUARY 15.)

THE action of vegetable and mineral oils upon rubbers, up to the present time, is considered by many manufacturers to be wholly destructive, but such is not the case, providing no air is present. If pure rubber is boiled for some time in a mineral or vegetable oil, it will dissolve, leaving no residue. The rubber can again be recovered by precipitation with boiling absolute alcohol. On examining the precipitate, it will be found to have the identical physical and chemical properties as formerly. But if a current of warm air is made to bubble through, or better still, by adding a solution of hydrogen peroxide to the warm liquid a remarkable change is observed. The rubber will have entirely altered its composition, instead of being able to obtain a copious precipitate by means of alcohol, a nasty slimy deposit is the result; and a great quantity of the rubber still remains in solution, this semi-oxidized substance being soluble in alcohol. The precipitate which is obtained is a modified rubber, and cannot be brought back to its original condition. The action which has taken place is very complicated, and will require an enormous amount of experimental work to be able to understand the actual change. What is supposed to have taken place is, the rubber has become partially or perhaps wholly oxidized. In high organic homologues, rubber is a representative of that class of compounds (so many isomeric bodies may be developed) when the complexity of such a decomposition is the result. So much mystery at present surrounds this interesting class of bodies that it is almost impossible to understand the precise nature of such reactions of decompositions. What can be done is to discover the real active principles which bring about such molecular changes, and perhaps in time, by careful investigation of these active principles, something may be learned of what is now wrapt up in obscurity.

The action of vegetable and mineral oils upon rubber might be made use of in estimating the actual amount of caoutchouc in crude rubbers or its recovery from waste rubber goods. Crude rubber is chiefly composed of resins and caoutchouc, the amount of resins in these crude rubbers is universally proportionate to its superiority or inferiority, and their toughness and elasticity is governed accordingly.

The oily or fatty substances found associated with cotton and woolen cloth has the power of bringing about this separation of the caoutchouc and the resins (the term *caoutchouc* is used when absolutely pure rubber gum is understood) and causing the sticky and clammy feel which very often frequents waterproof garments. This particular deterioration of rubber proofed goods may often be avoided if prior to the spreading of the rubber dough upon the cloth, a coat of shellac dissolved in ammonia water is carefully laid on and thoroughly dried. This operation leaves a very thin varnish of an oil resisting surface and prevents the rubber coming in contact with the cloth. The writer has found this method highly advantageous in preserving the longevity of macintoshes. The operation is simple and inexpensive, providing the necessary machinery is at hand.

The method of estimating accurately the amount of fatty substances in cotton and woolen cloth is by means of certain solvents, chloroform, carbon bisulphide and sulphuric ether are the most frequent solvents used, a great majority of fatty substances are dissolved by them with the greatest ease. The dried cloth is thoroughly washed by one of these solvents until the whole of the fatty substance is entirely removed, which can be ascertained by placing a drop of the solvent upon a clean glass plate and allow it to evaporate spontaneously. No greasy spot should be left if the operation is complete. The solution containing the dissolved fat is placed in a flask and distilled until the whole of the solvent has evaporated. The residue is the fatty substance contained in the cloth, which is weighed and the percentage calculated accordingly. Often the fat extracted from dyed cloth is colored owing to the slight amount of coloring matter dissolved by the solvent, but for all practicable purposes, as the amount is so infinitesimal, the whole may be calculated as fat.

II.—THE ACTION OF MINERAL SUBSTANCES USED IN MORDANTING AND DYEING.

There is a great diversity of opinion among chemists as to the effect of mineral substances upon rubber in its various stages of manufacture, and most of those who have had their attention drawn to this particular branch of the industry seem to have failed in elucidating some of these problems. More than this, they utterly failed in explaining some of the every day occurrences of decompositions and deteriorations so prevalent with the trade.

Some years ago, an article was written in the English rubber journals upon the "Effect of Copper Upon Rubber" by Dr. Burghart, of Manchester, wherein he states that copper, either in the metallic state or as salts, *has not* an injurious effect upon rubber. And that copper may be used with impunity in all compounds of rubber. In a lawsuit soon after, this assertion was actually sustained, the writer's father, Mr. J. Carter Bell, A. R. S. M., opposing it. A few years later another article appeared, by the same author, contradicting the whole of his former experiments. Then in a subsequent lawsuit upon the same subject, his former views undergo an entire change; thus throwing the matter again in doubt. Another chemist, Mr. Wm. Thompson, of Messrs. Grace, Calvert and Thomson of Manchester, took up the subject, and from a very incomplete set of experiments hazarded the opinion that certain metals, especially copper, have a marked influence upon all classes of rubber, which should be fully understood before their use were permitted. But this experi-

menter does not offer an explanation to elucidate the real cause of such decompositions.

Many others have endeavored to illustrate conclusively the actual effect of metals upon caoutchouc in all its stages, but on comparing the results of each, it may be asked, how is it possible for so many persons to examine the same subject and arrive at such widely different results; and some doubt may arise in the mind either as to the skill of some of the investigators, or as to the accuracy of the methods at present employed in organic and inorganic chemical research. Perhaps these past investigators in this field of inquiry may be blamed for the inaccuracy of their respective results, to a want of knowledge of the commercial branch of the industry, and depending upon others for the proper performance of their experiments.

Much may be understood by carefully following the chemical aspect of such decomposition caused by many of the metallic elements when brought in close proximity to caoutchouc; after which, by taking a step further, their reaction with all the vulcanizing bodies thus will lead to some elucidation of the behavior of these peculiar chemical compounds.

EXPERT TESTIMONY IN THE ACID PATENT SUIT.

[*Chemical Rubber Co. vs. Goodyear's Metallic Rubber Shoe Co.*]*

ARTHUR W. CLAPP, whose testimony was taken in Boston in 1891 before Henry W. Shugg, notary public, testified that he was then manager for E. H. Clapp's rubber business. He began in this business in March, 1875, working as a boy in the factory at Hanover, Mass. He worked up through the various grades, having experience in all departments. He continued at Hanover for three years, and then went to Boston to take charge of E. H. Clapp's metal foundry. In August, 1880, he returned to Hanover to take charge of the rubber-factory while the superintendent was on a vacation. On the latter's return changes were made, the Boston foundry connection given up, and Mr. Clapp remained permanently at the mill, taking the position of assistant-superintendent and selling agent. This position he filled until the spring of 1891, when he was made general manager of the rubber business. Mr. Clapp testified that he was familiar with the processes used in recovering rubber, both mechanically and chemically. Indeed, parts of the processes were his own invention. He was familiar with the selling of these goods, and personally visited about every manufacturer of rubber goods in the United States during the last ten years. He brought out in his testimony that acid rubber was cheaper than mechanical, because the latter could be compounded more heavily in use, and was not injured by the acid. Mechanically-recovered rubber more closely resembled new rubber than did the other, and could be used in some places where acid could not—for instance, in rubber clothing. He was of the opinion that the acid was liable to remain in the stock and rot thin cloth. Further than this the resultant product was harder than that obtained by the mechanical recovery. He attributed this hardness either to the action of the acid in the bath or to a continued action brought about by the processes of devulcanization. He had seen samples of stock of various makes shown him from time to time by rubber manufacturers, and had found them similar to the stock he himself manufactured by the acid process. Samples had been shown him by the manufacturers which, they said, were from the National India Rubber Co., Philadelphia Rubber Works, Loewenthal & Morgenstern, Murray, Whitehead & Murray, and the Derby Rubber Co. The recovered rubber manufacturers, he said, recognizing that acid rubber was harder than mechanical, were in the habit of adding oil or unvulcanized clippings to it to overcome this effect. He said that he had recently tried experiments under the United States patent granted to Hayward in October 27, 1863, and also under the French patent granted to Faure April 3, 1871, the only difference being that he had finished the experiments with modern ideas regarding the washing and the preparation for sale. In the Hayward experiment he used 1000 pounds of rags or fibrous India-rubber and boiled them from ten to twelve hours in a mixture of eight hogsheads of water and seventy-five pounds of sulphuric acid. The boiling was effected by copper steam-pipes arranged in the bottom of a wooden tank. The acid was later removed by washing He read from the translation of the Faure process describing the experiments that he made under that patent. In this he used sulphuric acid of 53 to 58 degrees Baume, using 100 kilograms of acid to 100 kilograms of cuttings. The translation called for immersion from one day to one week, according to the nature of the material, the degree and temperature of the acid. It suggested also that it was better to have the acid from 60 to 80 degrees temperature. After the process of rotting the fiber was accomplished the clippings were washed in the usual manner. He followed these two patent formulæ exactly, except as far as the washing and devulcanizing were concerned, which he did in the modern and common manner. He found the product merchantable, free from fiber, and that it showed all of the peculiar characteristics that mechanically prepared rubber shows. In answer to questions he testified that he had ground and sold car-spring rubber for many years, but that it could not be devulcanized. Old rubber shoes, he found, could be easily devulcanized, and that they enter into almost all lines of rubber manufacture. The business in ground car-spring rubber had fallen off steadily for the last ten years, nor could the ground article be used in any line of goods which require a thin, smooth sheet.

In the cross-examination Mr. Clapp testified that no oil was used in the mechanical processes, that the sheeting of

*In THE INDIA RUBBER WORLD of October 15, 1893, will be found the particulars of the points at issue in this suit. Portions of the testimony taken have appeared in the issues of January 15 and February 15.—THE EDITOR.

mechanically-recovered gum was affected by the process of the devulcanization and by means of a hot friction grinder. Describing the Hayward experiment that he tried more in detail, he said that he used eighteen pounds of old shoes with sulphuric acid at two degrees Baume. He used 112 pounds of this solution, boiling it ten hours. In the Faure experiment he used 100 pounds of shoes, 100 pounds of acid at 53° B., boiling them ten hours, the temperature being from 140° to 150° F. This solution was heated by a closed pipe and it was only necessary to heat it very slightly to keep it above 140°. When questioned as to the process used by him in devulcanizing mechanical rubber he, while declining to answer specifically, as their special process was their own business secret, said distinctly that nothing of any nature or name was added to the rubber.

EMMETT A. SAUNDERS testified that he had examined the Hayward, Faure, and Hall patents, that he was familiar with the testimony of C. H. Hayward, and other concerning the use of the Hayward patent, of J. B. Forsyth, John Murphy and others also concerning the early use of the acid process. He believed that the results obtained by these processes described were identical with those obtained by the processes used by the defendant, that is that fiber was "rotted" and "broken up" at the end of the acid treatment, and that a washing process was then necessary. He stated that he had treated rubber in accordance with the process stated. The result was the same in all different cases differing only in thoroughness. Replying to the statement that a criticism had been offered to the effect that the strength of acid in the Faure process hurt the rubber he said that he had never found it so, but had gotten excellent results in his use of that process. He had followed the Faure process throughout in the Chinese fashion, that is following the formula exactly and had gotten the best of results. At the same time he stated that varied stocks require skill and judgment in the treating and more or less variation as to strength of acid, temperature, etc. Illustrating this, he said that a mass of unvulcanized rubber and cloth clippings might take hours to become thoroughly wet through, while fine ground ladies' shoes would be penetrated by the solution in a very short time. It was his opinion that the Faure patent left much to the judgment and skill of the operator. To establish this, Mr. Saunders went through with the translation of the patent, citing paragraph after paragraph and giving his interpretation of the same. Replying to the criticism that the Hayward patent called for too weak a solution of acid he said he did not think so. He claimed that acid of that strength would cause rubber to "crumble to powder" when upon the rolls also that it could be "easily separated" leaving the India-rubber to be used alone. Personally, he had found the Hayward process successful. Here again he held that judgment as to the amount of acid and water and temperature must be used, and fitted to the condition of the scrap to be recovered. He testified further that the defendant's process and the Hall patent were identical so far as the use of acid is concerned. That is, the same proportions of acid in water were used in each and the same results obtained. Mr. Saunders prior to this had submitted numbers of samples of acid recovered rubber, which were held as exhibits. Of these the sample numbered 5 was one in which he used the Hayward process, his memorandum stating that he used 75 pounds of acid, 4031 pounds of water, 1000 pounds of rubber scrap. This he boiled 26 hours, adding water from time to time. The exhibit numbered 2 was the result of the use of the Faure process. Through a mistake in this experiment the temperature was carried to 250 F. The acid used was 53 B. in strength and rotting of the fiber was accomplished in twenty minutes.

An interesting point in Mr. Saunders's testimony was concerning the effect of the atmosphere upon rubber, particularly the injury that it did to rubber recovered by the acid process. He testified that to overcome the action of the acid in rubber, he was accustomed to treat it to an alkaline bath after the acid bath. The office of this alkaline bath was to cleanse the rubber, but more particularly to neutralize the dregs of the acid that might possibly remain after the bath and the washing. It was his opinion that devulcanization stopped the atmospheric effect that may come to acid recovered rubber. It was brought to his attention that in the exhibits that he had submitted those treated by the weaker acids had deteriorated through contact with the atmosphere more than those treated with a strong solution. He explained this by saying that the weaker solution was used at a high temperature and for a long time, and that the rubber probably absorbed the liquid so thoroughly that some of it did not wash out. He referred to the faculty that rubber has, in spite of its well known waterproof qualities, of absorbing large amounts of water or other liquids, particularly when the liquid is boiling hot. Regarding the destruction of woolen fiber, he said he did not think it necessary for acid to destroy it, as the devulcanization did that most effectually. He had put old rubber shoes through a devulcanizing process without any other treatment and found the wool reduced to a black powder which he supposed to be charcoal. He testified that a pound of fine vulcanized rubber not devulcanized was of no more use in an ordinary rubber compound than a pound of whiting and that it was not nearly so cheap. He believed devulcanization to be absolutely necessary to make vulcanized rubber of any general use to rubber manufacturers. He testified that he first used recovered rubber which was purchased from E. H. Clapp and devulcanized by the defendant, as Mr. Clapp then had large facilities for grinding but small for devulcanizing. He cited the Hall patent of November 30, 1858, as covering the process of devulcanization. The first chemically recovered rubber that he had purchased came from J. M. Stotesbury & Co., of Philadelphia. An interesting point in his testimony was his statement that if he could have his choice to day he would choose a plant for mechanically-recovered rubber rather than chemical. His reason for this was that he believed to-day the mechanical stock could be produced as cheaply as the chemical. One reason for this was that shoes were cheaper and that there were new mechanical devices more effective than the old.

THE WOOL-BOOT COMBINATION.

By Victor Yarros.

FOR several years past certain rubber-manufacturers have gone outside their real province and manufactured for themselves the wool boots which are sold in combination with the lumbermen's "overs" and other descriptions of the rubber shoe made for the benefit of people who are exposed to the inclemencies of the weather or who live in the colder sections of the country. This year this tendency is more pronounced than ever, and more and more rubber-manufacturers are making preparations for the manufacture of the wool boots.

The explanation is very simple. The wool boot-and rubber-shoe "combination" has been on the market for over ten years. The trade was at first confined to the lumber districts, and the shoe received the name of lumbermen's overs. Gradually the demand for them went on increasing, until to-day the quantity sold in the United States and Canada is enormous. In the east the demand comes from farmers chiefly, though truckmen, car drivers, day-laborers working in the parks, and on the streets make no inconsiderable class of purchasers. Still the weather in the east is so mild and changeable that the trade is not expected to be very great. In the northern and northwestern sections, however, the trade is growing very rapidly. It is this fact that has induced the rubber-manufacturers to undertake the manufacture of the wool boot on this account. The question with them in this case, as in any other, was simply whether the demand is large enough to justify their branching out in the way referred to. If they can manufacture the wool boot at less cost than the price they have to pay to the felt-manufacturers, of whom they have had to buy the wool boots, it is plainly in accordance with business principles to save the portion paid out in profit to other manufacturers. The bicycle manufacturers who make their own tires do exactly what the rubber-manufacturers propose to do, and what any class of manufacturers is sure to do as soon as it is perceived that there is a profit in manufacturing any part of an article in which they are directly or indirectly interested.

So far as the purchasing public are concerned, the new departure of the rubber-manufacturers in making the wool boots will be of substantial advantage. Certainly the wool-boot-and-rubber-shoe combination can be sold cheaper under the new arrangement than when either the rubber-manufacturer or the jobber had to buy the wool boot of the felt-manufacturer. It is no greater expense to push, advertise, and place on the market through agents and catalogues the entire combination than it is to market either part of it. The rubber-manufacturers save one expense, and this saving will go in part at least to the purchaser. It is also well known that the jobbers would rather deal with one manufacturer and buy the whole combination of him than with two different classes of manufacturers. At first this was what they had to do. The jobbers bought the rubber shoe of one man and the wool boot of another, and then put them together for the trade. Later, the rubber-manufacturers secured the wool boots and offered the combination as a whole to the jobber. Now another step is taken, and the wool boot will be manufactured by the man who manufacturers the rubber shoe.

The transition, as Mr. Nathaniel Fisher (one of the chief jobbers in New York, whose agents sell the wool-boot-and-rubber-shoe combination throughout the country) said to the writer, was rendered easier from the fact that some rubber-manufacturers, notably Mr. Banigan, have been interested in felt-mills for a long time, in consequence of the felt-and-wool-lined boot and shoe trade, which has been very large. From making the lining for a rubber boot to making a wool boot into which no rubber at all enters is a short and natural step, considering the large field for this article.

The wool boot is not fastened to the shoe, any more than an ordinary shoe is fastened to the stocking. Some buy the boot only, and some only the shoe. Besides, one pair of boots will outwear three pairs of the shoes—the shoes being next to the ground—although the shoes cost nearly three times as much as the boots. The price of the combination ranges from $1.85 to $2.50, there being several kinds of boots as well as of the shoes.

Mr. W. Southwick, of the New York branch of the Goodyear's Metallic Rubber Shoe Co., told the writer that last year the felt-manufacturers had cheaper boots on the market than any that the rubber men offered in this combination, but, while the article was cheaper, the quality was inferior. Where the quality was the same, the advantage was on the side of the rubber manufacturer. For the same price the buyer got a better boot from the rubber-manufacturer. Mr. Southwick added: "Last fall, when the first snow storm came, the New York stock of the wool- and rubber-shoe combination was exhausted in two days, and no one here could get any fresh supply. A good deal of profitable trade was thus lost. In Maine, Minnesota, Michigan, and other sections where the winter is severe, large supplies are ordered in the spring, but here in New York state nobody expects severe weather for any length of time, and so we are sometimes caught unprepared."

The Goodyear's Metallic Rubber Shoe Co., who started the Medford Mfg. Co., and the Woonsocket Rubber Co., who opened the Lawrence Felting Mills, are among the concerns that are manufacturing the wool boots for themselves, both of these wool boot concerns being now the property of the United States Rubber Co.

The companies that manufacture wool boots are the Lawrence Felting Mills, of Millville, Mass., and the Medford Manufacturing Co., at Medford, Mass., both the property of the United States Rubber Co. There are also the Mishawaka Woolen Manufacturing Co. and the Beatty Felting Co., at Wishawaka, Ind., the Grand Rapids

Felt Boot Co., at Grand Rapids, Mich., the Hastings Wool Boot Co., at Hastings, Mich., the Niles Wool Boot Co., at Niles, Mich. Besides, there are also three concerns making what is called the German sock, which is getting to be a very close competitor of the wool boot. These concerns are the Kalamazoo Knitting Co., at Milwaukee, Wis., the Western Knitting Mills, at Detroit, Mich., and the Pontiac Knitting Works, at Pontiac, Mich. The Woonsocket Rubber Co. and the American Rubber Co. will use the output of the Lawrence Felting Mills and sell at the combination price. The Wales-Goodyear and the Candee companies will use the product of the Medford Manufacturing Co., selling at the same price as the Woonsocket. What the Boston Rubber Shoe Co., the Colchester and the other large companies who make lumberman's overs will do is not known, although there are many guesses in the trade. An interesting point that the discussion of the combination price brings up is whether the cut is on the wool boot or on the lumberman's over, and, if it is on the over, why will not this inaugurate a wool cut by those outside of the projectors of the scheme? The retailers seem to feel that the cut is on the lumberman's over, and if they can get less price on one kind of rubber footwear, there may be hope that prices will be lowered on some others, and it is predicted by some of the leaders that they will hold off on this account. At the same time it is not always safe to believe what the retailer says regarding prices, as he is always a "bear."

RUBBER-TIRE NOTES.

THE SINGLE-TUBE TIRE.—It is by no means certain that the success of the original inner-tube tire on the racing track when it was in competition with solids and cushions proved the complete supremacy of that particular type of pneumatic tire. The experience of the past season has shown that the single tube has fast qualities and it would not surprise us to see a still larger number of this type going to the front and largely used by the fast brigade during the 1894 racing season.—*The American Cyclist.*

TO PRESERVE PNEUMATIC TIRES when out of use during the winter months, they should be kept half inflated in a moderately warm room. If left in a cold place they get hard, and are liable to crack when used. Before being laid away they should be thoroughly dried, so that the canvas will not rot.—*Cycling.*

AMOUNT OF RUBBER IN A TIRE.—The pneumatic tire, instead of taking more rubber in its construction than the cushion tire or solid tire, takes less. It is much larger of course, but as much of it is canvas the eye is deceived in instituting a comparison. The rubber in it weighs about three pounds and is not necessarily pure Pará, while the cushion tire took eight pounds of rubber, and if it was not of the best quality the sack was manifest.

THE PERFECT TIRE NOT YET FOUND.—Charles E. Duryea says, in *Cycling:* "The tire question has not found its place yet. No tire has proved itself to have the most possible good points and the least objections. Whether 1894 will give us a tire that will meet the requirements and serve as a base for all future modifications is yet a question. The signs point toward a soft, transverse-thread fabric with a mechanical fastening and suited to all forms of rims. Riders are now looking for this, and are, therefore, uncertain people to place orders for. The wise dealer will not order tires faster than he needs them."

RUBBER COST IN BICYCLES.—In an article in the *Bicycling World*, itemizing the cost of a high-grade safety bicycle, rubber tires are put down at an average of $12 and pedal rubbers at 40 cents. These figures are based upon the supposition that large lots are involved.

STATISTICS OF TIRE PUNCTURES.—Statistics taken in a large bicycle club proved that out of 250 riders but one-third had had tires punctured, and the punctures averaged one to every 1600 miles ridden. In fact, the pneumatic tire of a bicycle or carriage is less liable to damage than any other portion of the vehicle. So say the American Dunlop Tire Co., in their pamphlet on pneumatic tires.

RUBBER CARRIAGE-TIRES.—Quite a number of pneumatic-wheeled carriages are in daily use about Hartford. We have talked with a number of the owners of these vehicles and find comparatively no complaint of puncturing.—*The American Cyclist.*

RUBBER TIRES FOR ROAD-WAGONS.—The New York Belting and Packing Co., Limited, announce the following prices for fitting pneumatic tires on carriages, road-wagons, and sulkies, per pair:

Sulky pneumatic tires with rims for 28- or 30-inch wheels.....	$35.00
Sulky pneumatic tires with rims for 43-inch wheels.....	45.00
Sulky pneumatic tires with rims for 47 inch wheels.....	50.00
Light road-wagon pneumatic tires with rims for 43-inch wheels..	50.00
Light road-wagon pneumatic tires with rims for 47-inch wheels..	50.00
Extra air-chamber for 28- or 30-inch sulky-wheels, each.....	4.00
Extra air-chamber for 43-inch sulky-wheels, each.....	5.00
Extra air-chamber for 47-inch sulky-wheels, each.....	5.50

THE PNEUMATIC TIRE AS AN AID TO SMUGGLING.—A young man from Bristol, England, landed in New York last week, accompanied by a pneumatic-tired bicycle. Something about the tire aroused the suspicion of a customs officer who is a cyclist himself, and he communicated his suspicions to another officer, who felt the tire, which seemed to be solid rubber all through. He insisted upon deflating the tire, to which the owner objected, but the attempt was made and was a failure. The valve was torn out and fine cut tobacco showed itself. Both tires contained ten pounds of the best English fine cut tobacco, which had been packed in solid, the inner tube having been first taken out. The Englishman escaped while the investigation was in progress, leaving his new machine, tobacco and all, in the hands of Uncle Sam's officials. The two tires had to be cut open in order to get the contraband stuff out, so tightly was it stuffed.—*American Wheelman.*

RUBBER-TIRED CARRIAGES IN NEW YORK.

THE use of rubber tires for carriages is increasing. The representative of a firm engaged in the manufacture of fine carriages said that they had been putting rubber tires on wheels for eight years, that they had put on more in the last two years than in the preceding six years, and that nearly all the fine carriages now ordered were ordered so equipped. They are placed on broughams and closed carriages for city use, but rarely on carriages for park use or for use on dirt roads, though such carriages are sometimes so equipped for invalids. The first cost of equipping a four-wheeled carriage with rubber tires is $100, renewals cost $60. The ordinary life of a rubber tire in this city is about one season.—*New York Sun.*

MACKINTOSHES AND THE TARIFF.

TO THE EDITOR OF THE INDIA RUBBER WORLD: I have read in your paper the views of the manufacturers of mackintoshes on the probable effect on the trade of the Wilson tariff bill, and it has occurred to me that the views and experiences of importers and jobbers of these goods in the past might prove of some interest.

Previous to the passage of the McKinley bill we imported ladies' cloth-surface garments, and single- and double texture men's mackintoshes. At that time the lowest price at which ladies' print-surface garments could be bought from the domestic manufacturers was about $3, while one similar in appearance could be imported for about $2, including duties and all expenses. Since that time our manufacturers have made immense strides in manufacturing these goods, and their goods are much more sightly and better than the foreign goods were, and as low in price.

Leaving out of consideration the fact that the imported goods grew hard in this climate, opened at the seams, and gave poor satisfaction generally, the fact remains that even if the tariff was reduced to what it was previous to the McKinley bill, our manufacturers could successfully compete with the imported goods, as they are manufacturing a superior garment for our market. Their product is more sightly in every way, and no one who has had experience in importing goods would ever think of importing such goods again. While large money was made in selling these foreign goods, ultimately there was money lost on account of loss of business and having goods returned for the defects I have mentioned.

Now as to the finer goods, such as wool-surface mackintoshes, a lowering of the tariff would be a positive benefit, as in manufacturing cloths for mackintoshes there is a very fine grade of wool required, which must be imported, as the goods must be thinly woven to avoid being bulky when made in double-texture garments.

There is at the present time a heavy duty on this class of wool, and if our manufacturers get the full benefit of the proposed reduction of duty, they will be in a position to compete with foreign made goods.

The difference in the price of foreign and American goods is in the cost of the cloth and the labor.

Now if our manufacturers can get the cloth as cheap as their foreign competitors, the only difference will be in the labor of putting the garments together. This difference is fully made up in the proposed duty that is to be continued on the mackintoshes.

To sum up, if our manufacturers can get their raw material free and there is a duty imposed on the manufactured article, they need fear no competition, J. P.

Baltimore, Md., March 1, 1894.

PROGRESS IN THE CITY OF PARA.

TO THE EDITOR OF THE INDIA RUBBER WORLD: In the interval of a year since I last saw Pará I find that the city has been improved greatly. The parks have been beautified, some fine residences have been completed, the streets have been better paved, and the really splendid theater is now lighted by electricity. A company is now being formed, of which I hope later to give you full information, to introduce electric lighting in private buildings and electric cars on the street-railways. About the only evidence that I can see here of the existence of a Brazilian war is the fabulously high cost of living. The masses of the people appear wholly apathetic on the subject, beyond grumbling at the advanced prices. It is believed here, by the well-informed, that the revolution will not last a great while longer, but its effects will continue to be felt for some time to come, no matter how it may end.

Still new enterprises are being formed in Pará. Next week a large paper-mill is to begin operations at Marituba, not far from Pará. Nor is there any scarcity of money. The sale of boxes at the theater for the first appearance of a company from Italy, to-morrow night, has been large. The last steamer from the south brought over $1,000,000. The arrivals of India-rubber are good. There have just come in 154,000 pounds of Island rubber, and 354,200 pounds from the Purús—the latter by the steamer *Belem*. The *Cyril* has also arrived from Manáos, on her way to New York, with 594,000 pounds. Altogether a great deal of rubber is expected this month or the next.

I don't know whether or not you are interested in the Brazil-Argentine boundary litigation, but some very important documents and a most important map of the river Pepiri have been discovered in the national library at Lisbon and forwarded to Washington by the Brazilian minister to Portugal.

The Baron de Marajó, who will be remembered as one of the Brazilian commissioners to the World's Columbian Exposition, has returned to Pará. He is now the mayor of the city, and a good one, too. GRÃO PARÁ.

Pará, Brazil, February 6, 1894.

LETTERS TO THE EDITOR.

TO THE EDITOR OF THE INDIA RUBBER WORLD: In your edition of February 15 you printed an article headed "A German Hard-Rubber Factory and its Owner", in which, among other things, you stated: "The Hanover Comb Co., which employs about 250 men," etc. This is an erroneous statement, as the factory which I represent—The Hanover Vulcanite Co., Limited—employs about 1000 men, and is certainly as large, if not larger, than any other rubber factory in Germany, making "hard and soft rubber and Gutta-percha goods" of superior reputation all over the civilized world.

JULIUS LEHMANN.

Office of George Borgfeldt & Co., Nos. 18–22 Washington place, New York, February 17, 1894.

WHO MAKES BALATA BELTING?

TO THE EDITOR OF THE INDIA RUBBER WORLD: We are in want of a firm to supply us with a similar belting to that known as Dick's patent Balata belting. It is made of Gutta-percha, Balata, and canvas, and in much the same style as rubber belting. It is an English patent. We do not want rubber belting. We can work the whole of Australasia if any firm can manufacture the goods properly and at about the same price as the English houses. J. C. LUDOWICI & CO.

Sydney, Australia, January 10, 1894.

OZOCERITE IN MONTANA.

TO THE EDITOR OF THE INDIA RUBBER WORLD: We noticed an article in your paper about ozocerite or mineral wax and write you, if not too much trouble, to give me the name of some party interested in the matter with whom I can correspond. On my hunting trips in this country I have run on to a quantity of the article. As much as half a ton of it is in plain sight and I am anxious to find out what I can do about it. I am satisfied that there is a very large body of it within less than two miles of a railroad. B. P. VAN HORNE.

Livingston, Montana, February 6, 1894.

BRIEF ABSTRACTS OF RECENT RUBBER-PATENTS.

AMONG recent patents issued by the United States Patent Office, embodying applications of India-rubber or Gutta-percha to a greater or less extent, have been the following. It is not practicable here to do more than to note the use of rubber in each case, with sufficient detail to enable those who are interested to decide whether or not to look into any particular patent more fully:

TIRES.

No. 513,433.—Bicycle Tire. August Meyer, Baltimore, Md., assignor of one-half to Frederick W. Clipper, same place.

A tire consisting of a core composed of solid compressible sections having a web and means for preventing lateral displacements of said web; and so inclosing casing.

No. 513,583.—Puncture-Proof Band for Pneumatic Tires. Sydney Lee, London, England, assignor to the Puncture Proof Pneumatic Tyre Co., Limited, same place, and Dublin, Ireland.

In a tire-protector the combination with a flexible strip or band of plates arranged alternately upon opposite sides thereof, eyelets in the band and rivets passing through both plates and eyelets.

No. 513,617.—Pneumatic Tire. Joseph G. Moomy, Erie, Pa.

The combination with the rim of the tire, an outwardly turned flap on the tire, and a binder wound or coiled several times around the rim within the space between the flap and the tire.

No. 513,639.—Pneumatic Tire. Leopold Holt, Frankfort o/M., Germany.

The improved method of repairing punctures in pneumatic tires of the solid-wall type, consisting of placing within the tire an air-tube having a series of strips or patches attached either directly or indirectly to its outer face by one point or part only so as to be easily detached therefrom, of injecting through the puncture rubber solution, of inflating the air tube carrying the repairing strips or patches to bring one or more of them into contact with the solution injected through the puncture, and of deflating the air tube when the solution is set and firmly attached to one or more of the repairing strips or patches.

No. 513,643.—Elastic Tire. Jeno V. Kemendy, Munich, Germany.

A tire or bolster having a series of upper and a series of lower cells formed by integral transverse partition walls, the lower cells having pointed upper ends alternating with the pointed lower ends of the upper cells whereby a zig-zag wall is formed intermediate of the sides of the tire, the walls being connected with the outer walls of the tire by the side walls of the cells.

No. 513,863.—Pneumatic Tire. William R. Barret, Passaic, N. J.

The combination, with the inner inflatable tube having the usual valve, the outer tube or cover, split longitudinally on its inner side, and the interlocking coils at the meeting edges of the cover, of the washers adapted to encircle the valve of the inner tube, and the flexible fastening rod having one end held to one washer and the other end screw-threaded and adapted to engage the other washer.

No. 513,900.—Device for Closing Breaks in Elastic Materials. Charles L. Dreher, Meriden, Conn.

In a pneumatic-tire repairer a flat head slightly concave on one side having a screw-headed shank extending from its concave face, combined with a conical head having a concave base, and a screw-threaded opening in the base to receive the shank.

No. 514,412.—Pneumatic Tire. William S. Callaghan, Baltimore, Md., assignor of one-half to Charles T. Holloway, same place.

In a vehicle wheel, the combination of a hollow metal rim having inturned hooked edges; a pneumatic tire; a cover for the tire having outward flanges, interlocking with the inturned hooked edges on the rim and provided with flexible edges, projecting between the sides of the pneumatic tire and metal rim; and a link-chain inclosed in and extending entirely around each of the outward flanges.

No. 514,796.—Pneumatic Tire. Frederick A. Wegner, Three Rivers, Mich., assignor of two-thirds to Charles H. Sage, Jr., same place, and William C. Kepler, Flowerfield, Mich.

An armor for a pneumatic or air-cushion tire, consisting of unwoven fibrous material having incorporated therewith a compound composed of powdered alum, powdered resin, and powdered Gutta-percha, mixed together in about the proportions set forth for the purpose specified.

MECHANICAL GOODS.

No. 513,799.—Manufacture of Hose. Nathaniel Lombard, Boston, assignor of one-half to Henry A. Clark, Brookline, Mass.

The method of producing woven rubber hose which consists first in collapsing a continuous rubber tube and inclosing the same while in a state of collapse with a textile covering, secondly in inflating the rubber tube as it is advanced after being covered, thirdly winding the inflated product upon a reel, severing such coiled portion and sealing the ends thereof, fourthly and lastly subjecting such severed coiled product to heat until vulcanization is effected.

No. 514,360.—Method of Manufacturing Packing for Journals. Harriet B. Delvan, Jersey City, N. J.

The method herein described for manufacturing packing for journals, which consists in comminuting sponge, subjecting it to the action of glycerin and caoutchouc, and mixing the same with bamboo fiber, hair, and a mineral substance.

No. 513,273.—Packing. John Murphy, Brooklyn, N. Y.

As an article of manufacture, an annular packing composed of interior layers of fibrous material laid at right-angles to the axis of the annulus and an exterior envelope of rubber, in combination with rubber intermediate the layers of fibrous material and stays beneath the rubber envelope whereby the union between the layers of fibrous material is reinforced; the bond between all parts being made by vulcanization.

No. 513,302.—Car-Door Packing. Ferdinand E. Canda, New York city.

The arrangement of the elastic packing tubes within recesses made in the corners of the door frame and door respectively, in combination with meeting corners of the door frame and door, which are adapted to press upon the packing tubes, whereby when the door closes the meeting corners will present a narrow edge or ridge against the exposed surface of the packing tubes, and thus produce an effective seal while at the same time the power required to close the door is diminished.

No. 513,322.—Hose-Clamp. Samuel J. Hart, Syracuse, N. Y., assignor to J. R. Clancy, same place.

A hose-clamp consisting of a band provided with clamping ears and with openings in its sides, and a liner extending from one side of the band across the space between the ears and having its free end inserted in the opening in the opposite side of the band.

DRUGGISTS' SUNDRIES.

No. 513,189.—Powder-Blower. Robert S. Knode, Omaha, Neb.

A powder-blower having an upper conical portion and a lower stopper portion with openings, the latter provided below with a valve, a tube, and an air-bulb, all arranged to operate substantially as described.

No. 513,238.—Syringe. Joseph Lalonde, Winnipeg, Canada.

A syringe comprising a compressible water-bag or holder adapted to seat the user and having the aperture in one of its side walls surrounded on its inner side by a flange having notches or the like in its edge.

No. 513,190.—Atomizer. William Hugershoff, New York city.

The combination, with a nozzle, of a neck projecting from

the same, of an air compressing bulb connected with said neck, which bulb is closed entirely with the exception of the aperture, by means of which it is brought in communication with the neck, a plug in the valve and located above the neck, which plug is provided with an aperture extending from top to bottom and through which a jet of compressed air can pass, a liquid supply-tube secured in passing through the plug and having its upper end bent above the air jet aperture in the plug, an additional aperture extending through the plug from top to bottom, an upwardly closed valve in the aperture and a retaining pin passing through the aperture below the valve.

BOOTS AND SHOES.

No. 513,258.—Clasp for Boot-Trees. Adna D. Warner, Naugatuck, Conn.

In a boot-tree clasp, the frame having the longitudinal latch recess, the upwardly opening transverse trunnion grooves, the lugs projecting from the side of the same and bent so as to inclose the trunnions within the grooves and the spring seat below the level of the grooves, in combination with the latch and spring, all arranged whereby, in assembling the parts, the spring may first be inserted from the top, then the latch and then the lugs bent downward over the trunnions of the latch.

SADDLERY GOODS.

No. 514,031.—Curry-Comb. William Ransweiler, Akron, Ohio.

A shedder-bar provided with knockers, and notches located upon the edge of the bar, and a rubber shedder molded around the bar and into the open notches, all secured to the back of a curry-comb.

DENTAL APPLIANCES.

No 514,201.—Mechanical Dentistry. Lucius Robertson, Cincinnati, Ohio.

The improved method of forming a soft rubber ridge upon a vulcanite dental plate, the same consisting in first forcing and compressing the soft, non-vulcanizable rubber in the space intervening between the upper edge of the cast and its strengthening ring. and then applying the vulcanite material.

NOTIONS.

No. 513,416.—Dress-Shields. Robert Raphel, Brooklyn, N. Y.

As an improved article of manufacture, a dress-shield consisting of an internal waterproof layer, an absorbent layer superimposed on the waterproof layer, a perforated waterproof layer superimposed on the absorbent layer, and an external covering layer which entirely covers the perforated waterproof layer.

INSULATED WIRE.

No. 513,982.—Electric Conductor. Horace F. Chick, Watertown, assignor of two-thirds to Frank A. Spooner and Ronald A. Stuart, Boston, Mass.

In an electric conductor, one or more insulated conducting wires contained within a braided jacket or covering, a winding of tape or fibrous material saturated with insulating composition about the inner jacket, a jacket of braided wire surrounding the tape covering, and a fibrous jacket of strands saturated with insulating composition about or covering the wire jacket.

MISCELLANEOUS.

No. 514,080.—Life-Preserver. Peter Hohmann, Stapleton, N. Y.

A life-preserver, consisting of an inflatable body, substantially U-shaped, having means for connecting the ends thereof, and having a neck of a tube communicating with the interior of the body, the tube being threaded at its outer end and being provided with an interior, transverse wall, having a perforation, of a perforated disk in contact with the outer surface of the wall, and so adjusted that its perforation will coincide with the wall-perforation, and of a threaded cylinder, flaring at its outer end and having a perforated head at its inner end, the cylinder being adapted to enter the threaded end of the tube so that, when seated therein, its head-perforation will be closed by the disk.

No. 513,427.—Storm Apron for Vehicles. John F. Taubman, Fort Plain, N. Y.

A storm apron consisting of a case having the hinged cover, and the apron secured to the case and adapted to be inclosed therein.

No. 513,662.—Pneumatic-Tread Horseshoe. Henry J. Welch, Carthage, assignor of one-half to Calvin V. Graves, Natural Bridge, N. Y.

A horseshoe provided with a convex outer edge to form a calk, combined with an inflatable tube held in a groove in the shoe and having a thickened portion.

No. 513,871.—Elastic-Tread Horseshoe. Joseph H. Bowerman, South Haven Mich., assignor of one-half to Samuel B. Bowerman, same place.

The combination with a metal shoe, provided with screw-threaded apertures and nail-holes, and formed with a downwardly extending flange on its outer edge, tapering gradually from the toe or front to the ends or heel, of an elastic cushion, having a peripheral groove tapering from the toe gradually to the heel and forming a seat for the flange, and the screws for securing the cushion to the shoe.

TRADE-MARKS

No. 24,102.—Rubber Shoes. Boston Rubber Shoe Co., Boston and Malden, Mass. Filed November 1, 1893.

Essential feature, the word "Invisible." Used since October 18, 1893.

No. 24,122.—Hose, Belting, and Packing. Bowers Rubber Co., San Francisco, Cal. Filed December 5, 1893.

Essential feature, the words "Golden Gate." Used since December 5, 1893.

No. 24,123.—Hose, Belting, and Packing. Bowers Rubber Co., San Francisco, Cal. Filed December 5, 1893.

Essential feature, the word "Sunproof." Used since September 1, 1893.

No. 24,208.—Dress-Shields. The Canfield Rubber Co., Bridgeport, Conn., and New York city. Filed May 20, 1893.

Essential feature, the representation of a crescent-shaped figure scalloped on its convex edge and having a portrait of J. H. Canfield thereon. Used since July 1, 1892.

No. 24,237.—Billiard-Table Cushions Made of Rubber Compound. The Brunswick-Blake-Collender Co., Chicago, Ill. Filed January 20, 1894.

Essential feature, the words "Unrivaled Monarch." Used since July, 1877.

PATENTS RECENTLY EXPIRED.

No. 186,414.—Lamp-Flame Extinguisher. C. T. Colby, Newburyport, Mass. (Filed November 24, 1876.)

A lamp-flame extinguisher, composed of an elastic bulb, a metallic duplex tubular connection or head, a tube, and an ajutage, all constructed and arranged substantially as set forth.

No. 186,442.—Squirt Cans. J. W. Tallmadge, New York city. (Filed December 15, 1876.)

Two elastic bags, with one elastic nozzle above them, having two outlet-ducts, both inclosed in a metallic shell, the elastic bottom of which is operated by pressure of the hand.

No. 186,483.—Composition of Matter for Veneers. C. H. Land, Detroit, Mich. (Filed May 27, 1876.)

A composition of matter consisting of whiting, linseed-oil, rubber, turpentine, and sulphur, in the proportions and for the purpose specified.

No. 186,492.—Manufacture of Riveted Waterproof Hose. J. Murphy, New York city. (Filed August 14, 1876.)

In riveted hose, the combination, with the body and lining of the hose, of an intermediate re-enforcing strip, and rubber sheets.

No. 186,540.—Poultices. H. E. Canty, Liverpool, England. (Filed December 19, 1876.)

A water-bag, faced with spongeopilene or similar absorbent material, to serve as a poultice.

No. 186,592.—Artificial Leeches. Floyd F. McDonald, Blacksburg, Va. (Filed November 29, 1876.)

An artificial leech, consisting of an elastic bulb open at upper end, a T-tube open at its three ends, a small tube open at one end, and a knife, all connected, constructed, and arranged substantially as described.

NEW GOODS AND SPECIALTIES.

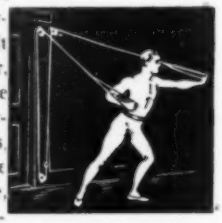
THE popularity of the "Pearl" corset-shield, which has been on the market for over a year and is now sold by the trade generally throughout the United States and Europe, and the demand for a "repairing" shield, has caused Mr. Eugene Pearl, the patentee of this invention, to place on the market a shield adapted to *repairing* a corset and also prevent its breaking at the side or front. This new shield meets a popular demand, as it is sold singly and at only 10 cents each. Many ladies break only one side and do not require a pair. It is a splendid notion-counter article. This new shield is sold under the name "Perfect," and is similar in construction to the "Pearl," excepting in shape—the latter being sold in pairs at 25 cents. Mr. Pearl's shields have been greatly improved since first introduced. Instead of stockinet being used for a covering as formerly, the finest corset-jean, with special perspiration-proof covering, is now employed. The Mattson Rubber Co. (New York), who have the contract for making these grades, have enlarged their facilities owing to the increased sales in this country and export orders. Mr. Pearl has offices at No. 23 Union square, New York, and sells direct to the trade.

THE "NEVER-GET-LEFT" TIRE.

THE "N. G. L." tire is having a remarkable sale, and to its friends as well as to those who have not yet seen it we present its picture. The tire itself consists, in brief, of an outer cover, an endless air-tube, and a clamping band which secures the cover to the rim. The manner in which this clamping band holds the tire and holds it firmly in place, whether inflated or deflated, is carefully described in a small pamphlet which the manufacturers of the tire will gladly send to any one interested in this subject. The important feature in the use of this clamping band is that it does not add to the weight of the wheel, that it keeps the air tube outside of the rim, where it belongs, and that it holds the tire absolutely rigid and immovable, so that there can be no friction or chafing. The tire itself is made from the best of rubber, the fabric is of the strongest long-fiber Sea Island cotton, and is made up in an honest manner by the most careful workmen. The tire is the outgrowth of much thought on the part of makers, who have been intimately connected with the tire business from its inception. Manufactured by the Boston Woven Hose and Rubber Co.

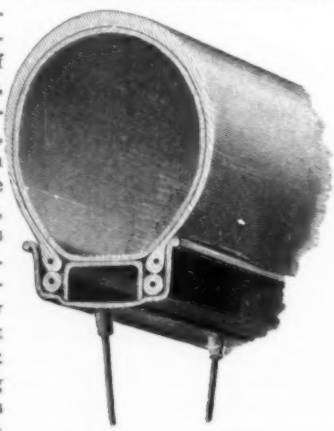
THE WHITELY EXERCISER.

THE Whitely method of physical culture is a radical departure from the older systems. It requires little time, no study, and no hard and tedious exercise. The Whitely exerciser consists of a pure gum cable of many strands, covered to protect it from the weather, with adjustable handles and swiveled attachments, running over three exceedingly fine, absolutely noiseless and adjustable cone-bearing pulleys, so arranged as to be readily suspended in various positions on small hooks attached to door jam, window casing, or any other convenient woodwork. The entire apparatus weighs a little over a pound. It is a complete apparatus for travelers, as it can be easily put up and can be carried in a valise or even pocket. There are no straps to handle, no jerks, no dead weights. The hooks are of steel wire, small but strong and do not injure the woodwork to which they are attached. The exercise makes all the movements that can be made on weight machines, and exercises all the muscles. It is adapted for ladies and children's use as well as to men's. Ira Perego & Co., No. 23 Park row, have the agency for New York.



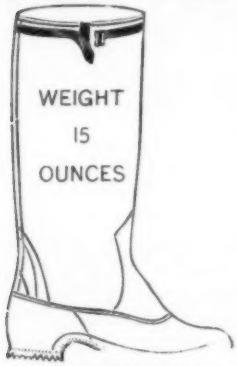
THE "SIMPLICITY NO. 47" TIRE.

A NEW detachable pneumatic tire that was recently exhibited at the cycle-shows is illustrated in the accompanying engraving. A few points claimed for this tire are that no cement is needed to fasten it, there is no lacing or mechanical fastening, it runs independent of inflation and is light, strong, and secure. The tire cannot come off when deflated, nor can it be removed from the rim except with the hands. It is claimed, further, that with this tire there is no rolling, rocking, or creeping in the rims. The principle of the tire has already been explained in THE INDIA RUBBER WORLD. It is based upon increasing the diameter of the gutters of the rim after the cover is put on, by partially fitting them with a rubber cord which encircles the rim at the bottom of the gutters and forms a cushion-bearing for the edges of the cover, securing it in an immovable position between the gutters and the top edges of the rim. Thus the cover is secured in the rim as firmly as if bolted. Circulars describing the tire in detail may be had of the manufacturers, the Manhattan Rubber Manufacturing Co., No. 64 Cortlandt street, New York.



A NOVELTY IN RUBBER BOOTS.

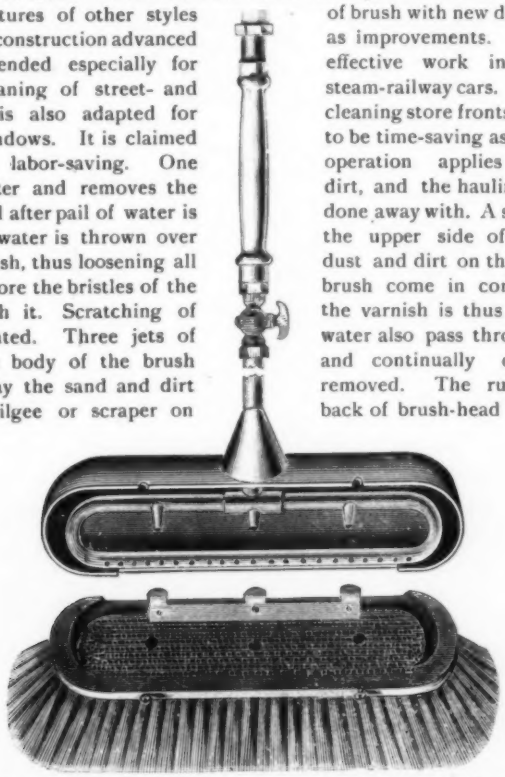
A RUBBER boot that is a decided novelty has lately been put upon the market by a Boston house. The boot is really a rubber shoe, with a very light pure-gum leg added to it. It is adapted particularly for business-men and clerks who require a rubber boot only in going to and from their offices. As the leg of the boot is very elastic rubber of extra size and with a high instep, it can be slipped on over the ordinary leather shoe. There is a strap at the top which allows the wearer to buckle it tightly, so that the trousers can be worn outside of the boot, or, if desired, they may be tucked inside. With the trousers over the boot-leg it looks as if one had an ordinary rubber shoe on. These goods are the invention of a well-known Sixth-avenue boot-and-shoe retailer in New York city, whose name is Nathan. They are marketed by Sage & Co. (Boston), agents for the Colchester Rubber Co.



A NEW RUBBER BOOT.

THE "DRAGON" FOUNTAIN BRUSH.

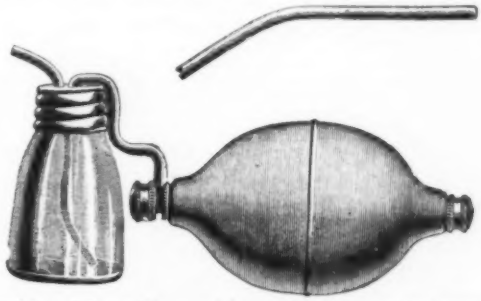
THE accompanying cut represents an invention that has found much favor with railroads and street railways. It combines the features of other styles of brush with new details of construction advanced as improvements. It is intended especially for effective work in the cleaning of street- and steam-railway cars. But it is also adapted for cleaning store fronts and windows. It is claimed to be time-saving as well as labor-saving. One operation applies the water and removes the dirt, and the hauling of pail after pail of water is done away with. A spray of water is thrown over the upper side of the brush, thus loosening all dust and dirt on the car before the bristles of the brush come in contact with it. Scratching of the varnish is thus prevented. Three jets of water also pass through the body of the brush and continually carry away the sand and dirt removed. The rubber squilgee or scraper on back of brush-head is a



quick means of drying the cars and windows. When the brush-head is worn out it can be removed and a new one put in its place. The handles are made to any length. The standard length from hose connection to brush-head is six feet. The appliance is specially recommended as a preservative of paint and varnish. It is placed in the trade by the Central Agency Co., No. 115 Broadway, New York.

THE POWDER INSUFFLATOR.

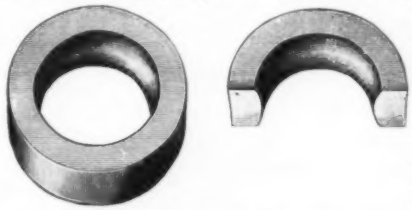
A NEW article somewhat in the line of atomizers is what is known as the "Powder Insufflator, No. 215." It is simple in construction and is gotten up so as to meet a popular demand for a low priced yet good article. It is furnished with an extra tube which is easily attached, and which diffuses the powder



thoroughly, either with or without this extra attachment. It never clogs, the metal parts are handsomely nickel-plated and the insufflator can be easily used with one hand. It is so simple that any one can take it apart and put it together again, and it is not liable to get out of order. Manufactured by Codman & Shurtleff, No. 13 Tremont street, Boston.

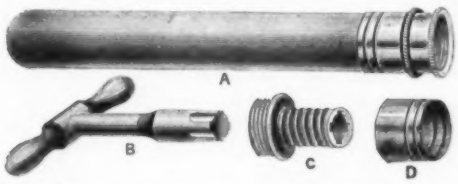
THE "RAINBOW" GAGE GLASS RINGS.

THIS is something new in the line of water glass packing, and responds to an undoubted need. The gage glass ring or packing is so constructed that it will prevent the breaking of the glass tube under any conditions, whether out of plumb or otherwise. It always remains soft and yielding, not becoming hard even when brought in contact with a high degree of heat. The displacement which takes place when screwing up the gland, being all on the inside of the rainbow ring, allows the glass tube to take any position without a strain or leverage on the same, thus obviating the troubles of which engineers so often complain. The "Rainbow" packing rings are put up in boxes containing one gross each, and there are different sizes. Patented and made exclusively by the Peerless Rubber Manufacturing Co., No. 15 Warren street, New York.


"RAINBOW" GAGE GLASS RINGS.

THE STANDARD HOSE-COUPLING.

WHAT has been well called the neatest coupling ever invented for garden or lawn hose is shown in the accompanying illustration. To describe it, *A* shows the coupling after it has been at-



tached to the hose, *B* represents the tool for attaching the coupling, *C* is the coupling itself, while *D* is the shell which fits over the end of the hose into which the coupling is screwed. This coupling thoroughly caps the end of the hose and absolutely

prevents the water from getting at the cotton duck and rotting it. It is very easily attached and so simple that any one can understand the operation of it. It is made in either nickel or brass and so attractive and effective is it that it has been adopted by the Boston Belting Co., from whose new catalogue of hose-goods the illustration and description are taken.

WATER-BOTTLE AND FOUNTAIN-SYRINGE.

A NEW combination water-bottle and fountain-syringe that is having a very satisfactory sale—called the "Niagara"—is partially shown in the accompanying illustration. It is really a complete water-bottle so arranged that the tubing and all the attachments of a fountain-syringe may be added to it. For this purpose the stopper of the bottle has an attachment to which

the rubber tube fits. The fittings for this are made of the best quality of hard rubber, while the bag and tubing are made of fine quality of white rubber. It is made in one-, two-, three,- and four-quart sizes, is packed in paper or wooden boxes, and fitted with five pipes. Manufactured by the Atlas Rubber Co., New York.

MINOR MENTION.

A SELF-EXPANDING life-belt, recently invented, is being exploited in London. The special feature of this belt is that it may be worn around the body during the day and need not be taken off even when retiring. Its weight is very small, and in its finished state it looks like a flat belt made of thin canvas coated with rubber. The moment the belt touches the water, however, through apertures in its surface, the water penetrates two chemical substances which are instantly united and the belt is at once inflated with gas. It is claimed that it will keep a heavily clothed person afloat for two days The belts are made of silk for ladies' wear and of canvas for men's wear.

—A new article that is having a very large sale in kitchens throughout the land is a shallow plate made of asbestos and steel. It is used either as a cooking mat, or to set hot irons on, or for any purpose where heat-insulation is desired.

—The circular rack used for displaying cloaks is becoming fashionable for the display of mackintoshes. It is made by a New York concern who purchased the patent of a Mr. Wolf.

—The floor-scrubber is now made of rubber and is an ash block 1½ inches thick, with rubber ¼ inch thick, with handles 4½ feet long. These are made of heavy, pure rubber, while a lighter article shades the above dimensions by one inch. The use of this device is well known. There is, however, the rubber bar- and counter-cleaner, not so often seen. This is an edge of rubber fitted into a walnut block, oil finished, the rubber being $\frac{5}{16}$ inch thick. It is the best article known for cleaning and polishing stone steps, and bar- and counter-tops, and the use of it is growing so rapidly that it would seem to be only a matter of time for its introduction into the household.

AFRICAN RUBBER—LIVERPOOL.

TO THE EDITOR OF THE INDIA RUBBER WORLD: A decline for most African kinds has to be recorded for the month of February. The demand has been fairly good at the decline. At the close there is not much disposition shown to purchase. The sales include: Benguela Niggers at 1/10 c. i. f.; Addah Niggers, 1/8½; Congo Ball, 1/9; Gaboon Ball, 1/7; Batanga Ball, 1/4½; fair Cameroon Clusters, 1/5½; prime Accra Biscuits, 1/11½; ordinary Liberian, 1/0½; Accra Paste, 6¼d; selected Old Calabar, 1/3½; Thimbles, 1/6¼; prime black Manoh Twists 2/3½; Grand Bassam and Assinee, 1/5@1/5½; and extra fine Sierra Leone Niggers at 1/7½@1/9.

WM. SYMINGTON & CO.

Liverpool, March 2, 1894.

A RUBBER-MANUFACTURERS' POPULAR RESORT.

IT is a curious fact, but the majority of rubber-men in the United States are more or less enthusiastic fishermen. The accompanying illustration shows a gentleman who will be recognized as a prominent druggist's-sundries manufacturer—Mr. Stearns, of the firm of Parker, Stearns & Sutton (New York). Whether he caught the string of bass that is suspended between himself and his companion history does not report. At all events, he spends a great deal of time in the summer at what is known as Woodside Cottages, in southern New Hampshire. These are near Lake Spofford, right in the pine region, where it is said that health-seekers are never disappointed. Some years ago since Mr. Stearns purchased these cottages and leased them to a New Hampshire man, who each year has a few guests who enjoy the fishing and drives and open-air life. While Mr. Stearns pays no attention to the management of the cottages, he is very apt to see that guests whom he knows have a good time, and numbers of them have spoken very highly of this summer resort.

ANGLERS AT A RUBBER-MANUFACTURERS' POPULAR RESORT.

TRADE AND PERSONAL NOTES.

A CERTIFICATE of incorporation of the Pacific Rubber Co., dated February 16, has been filed in the office of the secretary of state of New Jersey, setting forth that the business of the company is to manufacture and deal in rubber clothing and fabrics and rubber goods generally. This company succeeds the Pacific Rubber Works, and the object of the incorporation is to take in fresh capital. The business of manufacturing will be continued at Elizabeth, N. J., and a store and office will be located in New York city. The capital stock is to be $30,000, in shares of $100 distributed among the following-named incorporators: Isaac E. Gates, East Orange, N. J., 148 shares; Meline W. Halsey and Edward C. Woodworth, Elizabeth, N. J., each 1 share; Sidney H. Hartshorne and Frank M. Hartshorne, New York, each 50 shares. No change is to be made in the management, but E. L. Hersey, who was the superintendent of the Pacific Rubber Works, having charge of the factory and the sales, has resigned his position and will have no connection with the reorganized concern. Mr. Hersey will continue to represent The Empire Rubber Co. and to push its line of goods in New York.

—C. J. Bailey, the inventer of the rubber brush, is almost ready to spring another novelty on the trade. When it is fully developed THE INDIA RUBBER WORLD will be the first to illustrate it.

—The Waterman Machine Tool Co. (Providence, R. I.) are prepared to make molds for pneumatic tires. For over a year they have been more or less in this business, and have machines specially adapted for this class of work.

—At a recent fire in Troy, N. Y., some of the "Duplex" hose of the New Jersey Car Spring and Rubber Co. was found so deeply embedded in ice that it had to be dug out with pickaxes. It is said that there were probably twenty-five tons of ice on top of it, but in spite of this rough usage the hose came out in perfect condition, which is better than a written guarantee as to quality.

—In filling a recent order from England C. J. Bailey, of Boston, sent 100,000 pieces of his specialties to a customer there.

—The Chesapeake Rubber Co. (Baltimore) report that while the rubber-shoe trade in their section has felt the effects of the open winter, the demand for mackintoshes for the past two months has exceeded that of the corresponding period one year previous. This they attribute to two causes: (1) the use of mackintoshes is steadily on the increase in villages and in the country sections remote from the cities, leading to larger sales as the people become more generally educated to the advantages of these garments; and (2) in a season when economy is forced upon buyers the mackintosh is beginning to be accepted in lieu of overcoats, as being better suited for protection against both cold and wet weather than an overcoat alone would be.

—The Mattson Rubber Co. (New York) report an encouraging increase in business. Orders are coming in steadily, and they are kept pretty busy filling them.

—The New Jersey Car Spring and Rubber Co. are running full time and full force. Business, they say, is picking up.

—President Randolph, of the Commonwealth Rubber Co. (New York), reports that sales are increasing. Agents are finding it easier to sell goods, though money is still "tight."

—The roof of a new building erected by the United States government at Fort Wadsworth (New York Harbor), 41×241 feet, is made entirely of iron, the construction being of iron trusses covered with corrugated iron. The contractors are the Berlin Iron Bridge Co. (East Berlin, Conn.), who are also building the new works of the Stanley Electric Manufacturing Co., at Pittsfield, Mass., which are to be entirely of iron. The iron roof over a new dye-house for George C. Hetzel & Co., at Chester, Pa., will be furnished by the Berlin Iron Bridge Co., as will also the roof of the Citizens' Electric Light, Heat, and Power Co., of Lancaster, Pa.

—Recent orders placed with the Gleason & Bailey Manufacturing Co. (Seneca Falls, N. Y.) have been for another hose-wagon for the city of Auburn, N. Y.; hose-carts for the new waterworks at Gainesville, Fla.; a handsome new steel-frame "city-style" hook-and-ladder truck for Rockledge (a suburb of Philadelphia); a steel hook-and-ladder truck for Ford City, Pa.; and a steel hook-and-ladder truck for Darlington, S. C.

—The plant of the Manhattan Rubber Manufacturing Co., at Passaic, N. J., was built by a Mr. Engleman, of that city, who was also the owner of the land. The company have just purchased the plant and the land from Mr. Engleman, so that they now own their whole factory outfit, absolutely without encumbrance. In addition to this the company are exceedingly busy and are employing over 100 men.

—Francis A. Fisher, late with the Hodgman Rubber Co., Boston, is on the lookout for a proper rubber connection. He is a man of large business experience, having had a practical acquaintance with the rubber business for more than twelve years. Besides being a first-class accountant, he fully understands mechanical rubber goods and is an excellent salesman.

—The Williams Rubber Co., whose incorporation of which was mentioned in the last number of THE INDIA RUBBER WORLD, have organized under their charter with H. G. Williams, president; W. D. Blodgett, secretary and treasurer, and N. F. Sprague, superintendent. The directors in addition to these gentlemen, are George Crittenden and D. P. Bloodgood. The amount of paid-in capital was increased during the month to $26,000. The office and salesrooms have been removed from No. 849 to No. 703 Broadway, the factory remaining at No. 49 Crosby street. They are confining their business to the wholesale trade in mackintosh clothing, and report being compelled to employ additional help at their factory in order to take care of their orders which are increasing daily.

—The new valve which Elliott Burris, of the Manhattan Rubber Manufacturing Co., has invented is receiving very high praise from cyclists. While abroad Mr. Burris took some very large orders among the manufacturers of high-grade bicycles, among which may be mentioned M. Humber & Co., in England, and Aucoc & Darracq, of Paris.

—The Mason Regulator Co. (No. 10 Central street, Boston) are advertising to send to any one interested in their specialties a set of dominoes, the only proviso being that the correspondent send 10 cents for postage and packing.

—David Marr, of the Stoughton Rubber Co., has returned from a successful business trip through the west.

—H. P. Emerson of the Emerson Rubber Mills (Boston) when asked whether he expected to keep his plant in Reading (Mass.) permanently closed, said: "I expect in the course of a month or two to start up and run full time. My policy has been either to run full or close down entirely, as I do not think there is any money at all in running on half time."

—Prescott Brothers, Cornhill, Boston, report that hose orders have already begun quite favorably, and the present outlook is that the season will be a good one.

—A prominent rubber-manufacturer in New England, who has just put in one of the telethermometers manufactured by the Standard Thermometer Co. (Peabody, Mass.), says that he is able to see, as he sits at his desk in his office, exactly what amount of steam is carried on the vulcanizers in his factory, while on the paper dial there is a constant and accurate report of the steam-pressure during the entire heat.

—Probably the largest order taken in the United States for insulated wire was one given lately by the Brooklyn City Railway Co. to the Washburn & Moen Manufacturing Co. (Worcester, Mass.) This order included 180 miles of C. M. stranded weather-proof feed-wire, together with about 30 miles of another size. It represented in weight about 2,000,000 pounds, the order amounting to over $300,000.

—J. Francis Hayward, treasurer of the Cable Rubber Co. (Boston) is in California, and will stay there a few weeks with the idea of increasing the market for the company's goods on the Pacific coast.

—The Newton Rubber Works (Boston) have just equipped their mill with the Grinnell sprinkler system. Aside from this, new machinery has been added, including a full set of the latest improved lathes for hard-rubber work.

—A very attractive advertisement is the card sent out by the Boston Woven Hose and Rubber Co. relating to the "Milo" belting. The background of the card is a dark rich green, and the letters and cut of the trade-mark are printed in silver.

—Harry Hall, who recently started a rubber store at No. 113 Summer street, Boston, has had such satisfactory trade that he has secured more room and now carries a much more complete stock.

—Charles D. Cugle, for many years with Messrs. Boyd, Jones & Co., as manager of their mechanical rubber department, is now holding the same position with Messrs. Alfred Ely & Co., of Baltimore. Messrs. Ely & Co. have purchased from Messrs. Boyd, Jones & Co. their entire stock of mechanical goods and added it as a new department to their general line of mill supplies and tools, with Mr. Cugle in charge. Mr. Cugle is widely known in the trade as having been with the late firm of Janney & Congdon, of Baltimore, the Conant Rubber Co., of Boston and Hartford, and as buyer and manager of the mechanical department for Boyd, Jones & Co. The latter firm, needing more room for their other growing lines, will no longer carry a full line of mechanical goods. Mr. Cugle was recently in Cleveland on business for Messrs. Ely & Co. in reference to the Cleveland agency in Baltimore, which it is understood they will represent in Baltimore.

—Dame Rumor has it that Charles C. Peters of St. Louis, is about to go in business on his own account, and that he has taken a store in the Mound City, with the idea of doing a general rubber business in all its varied lines. Mr. Peters is well known in the southwest and also in the Eastern markets. He has been recently manager of the St. Louis branch of the New York Belting and Packing Co., and was formerly with the Sanders Duck and Rubber Co.

—J. Fred. Doty, of the Atlas Rubber Co. (New York), has recovered from his recent illness and is back at his desk.

—Mr. Minor G. Keith, the owner of the rubber-plantations n Costa Rica, described elsewhere in this issue, is temporarily at his home in Brooklyn. Mr. Keith's interest in rubber is of an entirely practical nature, and he expects his plantations to yield him large profits. He is interested in many other things besides rubber, such as cattle, bananas, etc.

—Mr. McCormack, of the Watson Rubber Co., who has recently returned from a business trip, will start upon another and more extended trip shortly.

—Mr. Herman Reimers, of the firm of brokers, Reimers & Meyer, sailed on March 4 on the *Maranhense* for Pará, where he will remain about two months. Mr. Reimers wishes to see the country and the conditions prevailing there. Among other things he will pay some attention to rubber production.

—The Colchester Rubber Co. have just put in a three-roll mixer mill. This mixer has a third roll immediately under the two top rolls, giving two points of contact, and it is confidently expected that it will do twice the work of the two-roll mixer. It was built by the Farrel Foundry & Machine Co., from special plans furnished by the Colchester Rubber Co., which company has already applied for a patent on the same. The mill is double-geared, two rolls being stationary and the front roll adjusted by means of screws set at an angle of about 45° and not horizontally as in the common mill.

—The International Wrecking Co., of Tacoma, Wash., recently incorporated in New Jersey to control the Grant Brothers' patents for raising sunken vessels by means of collapsible rubber cylinders, have been placed in the hands of a receiver: W. B. Allen, president of the Tacoma Trust and Savings Bank.

REVIEW OF THE RUBBER MARKET.

THE actual conditions in the rubber trade at the end of the month are much more satisfactory than were the prospects at the beginning of the month. Though prices have not advanced, they are decidedly firmer, and this tendency has been steady during the entire month since our last report. Some doubt has been expressed by men of prominence in the trade as to the legitimacy and permanence of the improvement in prices, and it has been attributed to artificial efforts. But there is hardly any doubt as to the distinct improvement in production. Manufacturers are getting orders and working full time in many cases, in spite of the fact that at this time of the year, even in good times, many rubber-factories close temporarily preparatory to the fall-trade manufacture. The explanation of this fact is that so little has been done during the dull months that even the slow rate of consumption that has prevailed has sufficed to reduce the stock of goods to a point where it is imperatively necessary to start up the wheels of production again. As a matter of fact, while there have been no large deals, buying of rubber by the manufacturers has been active enough to keep the brokers busy. All say that the deliveries have been excellent under the circumstances.

The deliveries in England have also been large, and business there is apparently in good condition. The demand for rubber there has steadily increased, chiefly, it is stated, in consequence of the development of the bicycle industry and the trade in electrical supplies.

The arrivals this month have been very large, and, but for the improvement in the trade, prices would have been forced down by the enormous addition to the stock at the end of last month. The fact that prices are firm, with a tendency to rise, is the best indication of an early revival in the rubber industry. The prospect now is decidedly encouraging. According to the judgment of the leading manufacturers, the revival is delayed by the uncertainty with regard to the character of the coming tariff legislation. There is fear that the senate may repeat its tactics on

the silver bill in the present case, and such a contingency would disastrously affect the fall trade. The improvement that has taken place has occurred in spite of congress, because of the wonderful recuperative powers of the country; still, a protracted debate on the tariff could not but injure the fall trade, for which preparations have to be made very soon.

Aside from the tariff there is no disturbing influence anywhere in the horizon. The Bland seignorage bill is a matter of complete indifference to the trade, as it is not believed that either its passage or rejection will at all endanger the present financial stability.

The statistical position of Pará rubber in New York and elsewhere is as follows:

	Fine and medium.	Coarse.	Total.		Totals 1893.
Stock, January 31, 1894	837	92	929	=	1009
Arrivals, February	758	254	1012	=	1361
Aggregating	1595	346	1941	=	2370
Deliveries, February	608	234	842	=	976
Stock, February 28	987	112	1099	=	1394

	1894.	1893.
Stock in England, February 28	985	445
Deliveries in England, February	630	502
Pará receipts, February	2685	3010
Stock in Pará, February 28	1264	2120
World's supply, February 28 [Excluding caucho.]	4713	4409
Pará receipts, June-February [Eight months of crop year.]	15,330	14,120

PRICES FOR FEBRUARY.

	1894.		1893.		1892.	
	Fine.	Coarse.	Fine.	Coarse.	Fine.	Coarse.
First	66	46	78	55	64	44
Highest	67	47	79	56	67	47
Lowest	65	46	75	53	64	44
Last	66	47	76	53	67	47

The latest quotations in the New York market are:

Pará, fine, new	66	Sierra Leone	22@39
Pará, fine, old	70@72	Benguela	45@46
Pará, coarse, new	46@50	Kongo Ball	35@41
Pará, coarse, old	none here	Camaroon Ball	35@36
Caucho (Peruvian) strip	46	Flake, Ord. and Lump	27@28
Caucho (Peruvian) ball	50@51	Accra Flake	14@15
Mangabeira, sheet	33@39	Liberian Flake	27
Esmeralda, sausage	48@49	Madagascar, pinky	55@60
Guayaquil, strip	30@35	Madagascar, black	38@43
Nicaragua, scrap	45@46	Borneo	26@42
Nicaragua, sheet	43@44	Gutta-percha, fine grade	1.30
Thimbles	37@38	Gutta-percha, medium	1.00
Tongues	32@36	Gutta percha, hard white	85

In regard to the financial situation Messrs. Simpson & Beers, brokers in crude India-rubber and commercial paper (New York), advise us:

"On March 3 the surplus reserves of the New York city banks were some $75,000,000, thus indicating the prevailing dullness in general business. There appears little increase in the supply of commercial paper, and we quote rates unchanged from last report, viz.: first-class receivables 4 to 4½ per cent., single-name notes 5 to 6 per cent. according to grade, and all from three to six months' maturity."

IMPORTS FROM PARA.

THE imports in detail of rubber direct from Pará at the port of New York, since our last report, have been as follows, all quantities being expressed in pounds:

February 19.—By the steamer *Scottish Prince*, from Pará:

	Fine	Medium.	Coarse.	Caucho.	Totals.
New York Commercial Co.	118,500	12,100	35,800	25,500	191,900
Reimers & Meyer	96,700	13,600	60,000	300	170,600
Ahrenfelar, Chas. & Son	1,700	.....	1,300	20,000	23,000
O. G. Mayer, & Co	20,900	.....	1,700	.....	22 600
Total	237,800	25.700	98,800	45,800	408,100

February 21.—By the steamer *Cyril*, from Pará and Manáos:

Boston Rubber Shoe Co	207,100	28,200	74,200	1,500	311.000
Joseph Banigan	148,200	22,500	40,000	.....	210,700
Reimers & Meyer	92,100	19,300	28,300	.....	139,700
New York Commercial Co.	45,600	3,500	7,300	.....	56,400
Lawrence Johnson & Co.	29,400	4,700	13,200	700	48,000
W. R. Grace & Co.	18,200	2,100	12,600	.....	32,900
Sears & Co	6,800	700	5,400	.....	12,900
George Cowl	4,300	400	800	.....	5,500
P. Lima	800	....	900	.....	1,700
Total	552,500	81,400	182,700	2,200	818,800

February 22.—By the steamer *Maranhense*, from Pará:

New York Commercial Co.	338,300	43,300	73,100	21,300	476,000
Boston Rubber Shoe Co	112,700	41,700	76,200	11,200	241,800
Joseph Banigan	76,800	28,500	55,800	4,100	165,200
Reimers & Meyer	54,300	13,200	53,000	1,000	121,500
Shipton Green	22,400	2,000	15.500	.....	39.900
Lawrence Johnson & Co.	20,700	3,200	12,000	.....	35,900
G. Amsinck & Co	1,100	1,000	.....	.....	2,100
Total	626,300	132 900	285,600	37,600	1,082,400

March 2.—By the steamer *Merida*, from Pará:

New York Commercial Co.	589,100	49,300	97,200	9,300	544 900
Reimers & Meyer	45,000	6,400	31,000	....	82,400
Shipton Green	.....	.....	.....	16,600	16,600
W. R. Grace & Co	.....	.....	12,000	.....	12,000
Total	434,100	55,700	140,200	25,900	655 900

March 5.—By the steamer *Justin*, from Pará:

Boston Rubber Shoe Co	58,500	15,000	57,600	300	131,400
Joseph Banigan	57,800	8,200	8,300	.....	74,300
Lawrence Johnson & Co.	6,800	1,600	10,200	.....	18,600
Reimers & Meyer	51,800	6,400	38,300	300	96,800
G Amsinck & Co	21,400	11,800	20,200	.....	53,400
New York Commercial Co.	18,800	3,200	26,600	1,500	50,100
Shipton Green	17,100	1,600	3,400	.....	22,100
W. R. Grace & Co.	.....	.....	9,000	.....	9,000
Total	232,300	47,600	173,700	2,100	455,700

March 8.—By the steamer *Basil*, from Pará and Manaos:

Reimers & Meyer	233,500	56,000	89,200	5,400	384,100
Joseph Banigan	139,800	16,500	49,200	.....	205,500
Lawrence Johnson & Co.	28,400	5,500	15,700	.....	49,600
Boston Rubber Shoe Co	116,000	12,900	35,400	.....	164,300
Carles Ahrenfeldt & Son	13,000	.....	3,000	144,100	160,100
Shipton Green	29,800	2,500	6,400	.....	38,700
Kuhnhardt & Co.	29,400	5,800	....	.....	35,200
Order	8,600	3,200	1,700	.....	13,500
W. R. Grace & Co.	.....	.....	10,800	.....	10,800
G. Amsinck & Co	2,300	.....	3,200	1,000	6,500
George Cowl	3,200	300	800	....	4,300
Herbst Bros.	1,300	.....	1,100	200	2,600
P. Lima	600	.....	400	.....	1,000
For Export	11,900	3,200	8,200	.....	23,300
Total	617,800	105,900	225,100	150,700	1,099,500

February Imports from Pará	2,309,300
January Imports	3,750,000
December Imports	3,226,200
November Imports	1,416,000
October Imports	1,661,600
September Imports	757,200
August Imports	914,100
July Imports	579,200
June Imports	1,955,915
May Imports	1,367,600

GOULD COMMERCIAL CO.'S STATISTICS.

IMPORTS FOR FEBRUARY (BY TONS).

GRADES.	New York.	Boston.	Total.
Parás	1,076	21	1,097
Centrals	154	..	154
Africans	211	76	287
East Indian	19	..	19
Totals	1,460	97	1,557

IMPORTS OF CENTRALS.

BELOW will be found in detail the imports at New York, during February, 1894, of India-rubber from Mexico, Central America, and South America, other than Pará grades:

	POUNDS
FEB. 1.—By the *Newport*=Colon:	
Piza, Nephews & Co.	16,735
To Order	9,000
J. M. Ceballos & Co	3,600
Flint & Co.	3,240
Bock & Co.	2,976
W. R. Grace & Co	2,668
Hoadley & Co	3,096
E. E. Britton & Co	2,028
Kunhardt & Co	1,800
W. Loaiza & Co	2,082
J. Aparicio & Co	3,830
H. Marquardt & Co	1,531
Lanman & Kemp	900
C. Roldan & Van Siekel	888
Hirzel, Feltmann & Co	700
Mecke	600
Total	56,862
FEB. 5.—By the *Premier*=Boco del Toro:	
A. N. Rotholz	600
FEB. 7.—By the *Yucatan*=Vera Cruz:	
Marquardt & Co	400
F. Probst & Co	200
Samuel Brothers	150
Graham Hinkley & Co	300
Total	1,050
FEB. 4.—By the *Alsa*=Cartagena:	
J. Ferro	2,250
W. R. Grace & Co	3,825
Flint & Co.	9,250
Total	15,325
FEB 11.—By the *Seguranca*=Vera Cruz:	
Seager & Guernsey Co	150
FEB. 11.—By the *Louisiana*=New Orleans:	
A. N. Rotholz	600
FEB 11.—By the *Columbia*=Colon:	
G. Amsinck & Co	17,447
J. M. Ceballos & Co	17,019
W. R. Grace & Co	7,086
A. Santos & Co	2,915
To Order	6,118
J. Aparicio & Co	6,425
Bock & Co	6,344
New York Commercial Co	6,000
Piza, Nephews & Co	5,096
Munoz & Esprella	4,465
Dumarest Brothers	2,976
Jacob Batz	1,520
To Order	685
D. A. De Lima & Co	1,406
C. Roldan & Van Siekel	500
Hoadley & Co	87
J. S. Tomas	96
Total	90,234
FEB. 14.—By the *Yumuri*=Vera Cruz:	
H. Marquardt & Co	200
E. Zarauz	200
J. A. Medina	400
Total	800
FEB. 15.—By the *New Orleans*=New Orleans:	
Betts & Robinson	7,755
Earle Brothers	2,900
Total	10,655
FEB. 16.—By the *El Paso*=New Orleans:	
Earle Brothers	2,500
Crossman & Bros	7,100
Total	10,000
FEB. 17.—By the *Miranda*=Greytown:	
Eggers & Heinlein	36,100
Andreas & Co	8,300
G. Carton	4,000
J. Agostini	900
Total	49,300
FEB. 19.—By the *Athos*=Carthagena:	
J. Ferro	1,200
Flint & Co	800
W. R. Grace & Co	1,800
H. W. Peabody & Co	300
Pim, Forwood & Co. (for London)	3,600
To Order	20,000
Total	27,700
FEB. 21.—By the *Orizaba*=Frontera:	
J. Agostini	150
W. E. Peck	600
Total	750
FEB. 21.—By the *City of Pará*=Colon:	
R. F. Cornwell	4,143
G. Amsinck & Co	3,630
Bock & Co	3,065
Piza, Nephews & Co	2,100
Eggers & Heinlein	1,379
A. P. Strout	1,863
W. R. Grace & Co	1,649
Hirzel, Feltman & Co	1,000
Crossman & Brothers	370
J. Aparicio & Co	158
To Order	9,008
Total	28,365
FEB. 22.—By the *El Norte*=New Orleans:	
Earle Brothers	3,200
Betts & Robinson	3,000
Total	6,200
FEB. 27.—By the *Louisiana*=New Orleans:	
Earle Brothers	4,000
Betts & Robinson	4,375
Total	8,375
FEB. 27.—By the *Alvena*=Port Limon:	
N. Weber	800
A. N. Rotholz	750
Total	1,550
Total Imports for February	308,511
Total for January	214,247
Total for December, 1893	218,047
Total for November	251,676
Total for October	255,321
Total for September	143,384
Total for August	134,636
Total for July	263,526
Total for June	190,921
Total for May	257,483
Total for April	200,389
Total for March	277,450
Total for February	244,525
Total for January	222,308

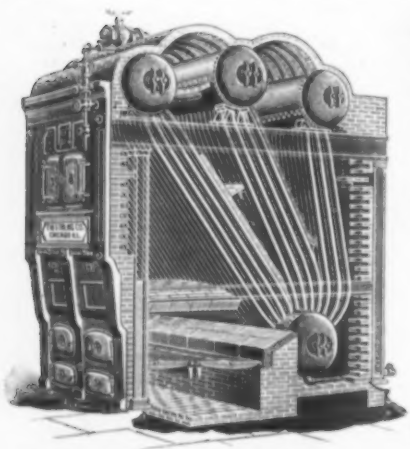
BOSTON ARRIVALS.

JANUARY.

	POUNDS.
JAN 1.—By the *Cambroman:*	
George A. Alden & Co., Africans	9,600
JAN. 4.—By the *Bostonian:*	
Reimers & Meyer, Africans	16,000
JAN. 11.—By the *Roman:*	
Reimers & Meyer, Africans	6,000
JAN. 17.—By the *Lancastrian:*	
Reimers & Meyer, Africans	16,000
JAN. 23.—By the *Cephalonia:*	
George A. Alden & Co., Africans	3,800
JAN. 25.—By the *Borderer:*	
George A. Alden & Co., Africans	7,200
Total	58,600

FEBRUARY.

FEB. 2.—By the *Norseman:*	
George A. Alden & Co., Africans	7,000
Reimers & Meyer, Africans	10,000
FEB. 7.—By the *Ottoman:*	
Reimers & Meyer, Africans	16,000
FEB 7.—By the *Columbian:*	
Reimers & Meyer, Africans	20,000
FEB 7.—By the *Cambroman:*	
Reimers & Meyer, Africans	13,000
FEB. 16.—By the *Sagamore:*	
Reimers & Meyer, Fine Pará	10,000
FEB. 20.—By the *Pavonia:*	
Reimers & Meyer, Africans	13,000
George A. Alden & Co., Africans	13,000
FEB. 20.—By the *Grimma:*	
George A. Alden & Co., Africans	21,000
FEB. 26.—By the *Sagamore:*	
Reimers & Meyer, fine Pará	9,000
Reimers & Meyer, Africans	5,000
Feb 27.—By the *Durham City:*	
George A. Alden & Co., Africans	7,140
Total	154,140



THE STIRLING WATER TUBE SAFETY BOILER.

No Cast Metal. ❋ No Flat Surfaces. ❋ No Stay Bolts.

No multitudinous hand hole plate,
four man holes giving access to every part.

THE STIRLING CO.,

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